I 29.88:F 51/V.1
Northeast Region
Clemson University
3 1604 016 796 809

FIRE ISLAND LIGHTHOUSE AND KEEPER'S DWELLING

Fire Island National Seashore
Patchogue, New York


PUBLIC DOCUMENTS
DEPOSITORY ITEM
MAR 2-9 2005
CLEMSON
LIBRARY

Historic Structure Report
Volume I

FIRE ISLAND LIGHTHOUSE AND KEEPER'S DWELLING

HISTORIC STRUCTURE REPORT
Architectural Data Section

Fire Island National Seashore
Patchogue, New York

By

Carole L. Perrault

Northeast Cultural Resources Center
Northeast Region, National Park Service
U.S. Department of the Interior
Lowell, Massachusetts

Written 1983

Published 2004


Digitized by the Internet Archive
in 2013 with funding from
LYRASIS Members and Sloan Foundation

http://archive.org/details/fireislandlighth00vol1

CONTENTS OF THE REPORT

VOLUME I

GENERAL PREFACE AND ACKNOWLEDGEMENTS
CONTENTS
LIST OF FIGURES AND CREDITS

CHAPTER 1. ADMINISTRATIVE DATA

CHAPTER 2. GENERAL HISTORY

CHAPTER 3. THE TERRACE AND OUTBUILDINGS: ARCHITECTURAL HISTORY

CHAPTER 4. THE TERRACE AND OUTBUIDINGS: CURRENT APPEARANCE AND CONDITION

CHAPTER 5. THE LIGHTHOUSE: ARCHITECTURAL HISTORY

CHAPTER 6. THE LIGHTHOUSE: CURRENT APPEARANCE AND CONDITION

VOLUME II

CONTENTS
LIST OF FIGURES AND CREDITS

CHAPTER 7. THE KEEPER'S DWELLING: ARCHITECTURAL HISTORY

CHAPTER 8. THE KEEPER'S DWELLING: CURRENT APPEARANCE AND CONDTION

CHAPTER 9. GENERAL RECOMMENDATIONS

CHAPTER 10. STATEMENT OF PROBABLE CONSTRUCTION COST FOR THE RESTORATION OF THE FIRE ISLAND LIGHTHOUSE (PRELIMINARY)

VOLUME III

APPENDICES

FIRE ISLAND LIGHTHOUSE
AND KEEPER'S DWELLING

VOLUME I

GENERAL PREFACE AND ACKNOWLEDGEMENTS

Situated on the north side of the island, the Fire Island lighthouse guided transatlantic vessels bound for New York Harbor for more than 100 years. Today, the black-and-white, striped lighthouse and its stone keeper's dwelling (fig. 1) continue to greet visitors to the west end of Fire Island, but only by day: both structures are inactive, and display but faded remnants of their majestic and humble past. Nevertheless, the lighthouse and its keeper's dwelling represent graceful symbols of a significant era in American coastal navigation–a history that the Fire Island Lighthouse Preservation Society, Inc., in cooperation with the National Park Service, is dedicated to preserving. The Preservation Society is a nonprofit organization incorporated to raise funds for the purpose of restoring and "relighting" the Fire Island lighthouse. It was the society that funded the preparation of this historic structure report.

* * *

Many organizations have aided me in my research endeavors on the Fire Island Lighthouse and Keeper's Dwelling. A number of individuals, however, stand out as deserving a special word of formal thanks. They are listed here alphabetically.

Fire Island National Seashore Superintendent Jack Hauptman, for his continual support and enthusiasm.

Fire Island West District Chief Ranger Nancy Howell, for coordinating my visits, and for providing me with a table and the warmth of her dining room (in the east side of the keeper's dwelling) as I took periodic refuge from surveying the unheated and windblown lighthouse in the depths of winter.

Fire Island Historian Dr. Steven Kesselman, for his guidance and assistance in retrieving material for this report from the historical files of the Fire Island National Seashore; and for his role as liaison between the Fire Island Lighthouse Preservation Society, Inc., and the Preservation Center.

Fire Island Ranger Rockwell "Rocky" Norris, for sharing his extensive knowledge of the U.S. Coast Guard; for his "cutting the red tape" on a research expedition to the Third-District Coast Guard Facility at Governor's Island; and to his wife Audrey and son Robert for courtesies extended while I surveyed their residence in the west side of the keeper's dwelling.

National Archives Archivist William Sherman, for his expertise with the U.S. Coast Guard records, and for never becoming exasperated with my endless inquiries into the lighthouse records.

Finally, I wish to extend my appreciation to the Fire Island Lighthouse Preservation Society, Inc. It is because of their fund-raising efforts that I, too, am now enraptured with the Fire Island Lighthouse.

* * *

Editor's note: At the time this report was written, the author was on the staff of the North Atlantic Historic Preservation Center (NAHPC), North Atlantic Region (NAR), National Park Service (NPS). The NAHPC has since become the Building Conservation Branch (BCB) of the Northeast Cultural Resources Center (NCRC); the NAR has become the Northeast Region (NER).

-- Sharon K. Ofenstein



Figure 1. Fire Island Lighthouse and Keeper's Dwelling: south elevations (1982).

CONTENTS

GENERAL PREFACE AND ACKNOWLEDGEMENTS vii
CONTENTS ix
LIST OF FIGURES AND CREDITS xv

CHAPTER 1. ADMINISTRATIVE DATA 1

THE RESOURCE 3

Significance 3
Location 3
Acquisition by the National Park Service 3
Current Condition 4
Preservation Efforts 5
Archeology 5

MANAGEMENT POLICIES 6

List of Classified Structures Information 6
Management Category 6
General Management Plan 7
Proposed Treatment 7
Proposed Use 7
Designation of an Historic Period 7

ORGANIZATION OF THE HISTORIC STRUCTURE REPORT 10

CHAPTER 2. GENERAL HISTORY 13

BACKGROUND 15

THE FIRST FIRE ISLAND LIGHTHOUSE 16

The Land Title 16
Construction 16
Demolition 17
Archeological Remains 17

Figures 18

THE SECOND FIRE ISLAND LIGHTHOUSE 20

Legislation 20
Design 20
Function 21
Pertinent Administrative Actions 22

General Historical Figures 25

CHAPTER 3. THE TERRACE AND OUTBUILDINGS: ARCHITECTURAL HISTORY 65

INTRODUCTION 67

TERRACE 67

Original Construction 67
Repairs and Alterations 69

OUTBUILDINGS 72

CHRONOLOGICAL LIST OF REPAIRS AND ALTERATIONS TO THE TERRACE AND OUTBUILDINGS, 1862-1939 76

CHAPTER 4. THE TERRACE AND OUTBUIDINGS: CURRENT APPEARANCE AND CONDITION 79

TERRACE 81

Platform 81
Fences and Stairways 82
Embankment Walls 83

Figures 85

OUTBUILDINGS 93

Paint Locker 93
Transformer Vault Building 93

CHAPTER 5. THE LIGHTHOUSE: ARCHITECTURAL HISTORY 95

INTRODUCTION 97

TOWER 99

Original Construction 99

Specifications and Drawings 99
Appropriations 100
Cost Estimate 100
Materials 101
Walls 104
Doorways and Windows 109
Interior Plan 110
Flooring 110
Stairways 110
Finishes 111
Completion 112

Repairs and Alterations 112

Figures 115

LANTERN AND LANTERN FIXTURES 122

Original Construction 122
Repairs and Alterations 123

Figures 128

THE LIGHT 136

Original Construction 136

The Fresnel Lens 136
The Fire Island Fresnel Lens 137
The Lamp 138
Fuel 138

Repairs and Alterations 138

The Lard-Oil Lamp 138
The Mineral-Oil Lamp 139
The Bivalve Lightning Lamp 139
Overhauling the Fresnel Lens 140

The Vapor Lamp 141
Removal of the Fresnel Lens 142
The Electric Incandescent Lamp 143
The Automated Lamp 143
Relocation of the Light 144

Figures 145

FINISHES 156

Exterior Finishes 156

1858 Finish 156
1865 Finish 157
1870's Finish 157
1891 Finish 158
1912 Finish 160
1945 Finish 162
Circa-1960 Finish 163

Interior Finishes 163

1858 Finish 163
Subsequent Finishes 164

CHRONOLOGICAL LIST OF REPAIRS AND ALTERATIONS TO THE LIGHTHOUSE, 1862-1939 165

CHAPTER 6. THE LIGHTHOUSE: CURRENT APPEARANCE AND CONDITION 169

TOWER 171

Foundation 171
Plinth 171
Exterior Walls 172
Interior Walls 173

Figures 178

FLOORING 202

Ground-Level Floor 202
Floor of the Sixth-Landing Room 202
Service Room Floor 203

Watch Room Floor 204
Lantern Floor 206
Trapdoors 207

Figures 209

STAIRWAYS 221

Main Stairway in Tower 221
Main Stairway's Safety Line 222
Stairway in Sixth-Landing Room 223
Stairway in Service Room 224
Stairway in Watch Room 224

Figures 226

CENTRAL COLUMN AND CONDUITS 237

Column in Tower 237
Column in Sixth-Landing Room 238
Column in Service Room 239
Conduits 239

Figures 242

DOORWAYS AND DOORS 252

Entrance Doorway 252
Doorway at Sixth-Landing Room 253
Doorway from Watch Room to Lower Balcony 254

Figures 257

WINDOWS 267

General Information 267
Window #1 269
Window #2 270
Window #3 271
Window #4 272
Window #5 272
Window #6 273
Window #7 274

Figures 275

LANTERN AND LANTERN FIXTURES 285

Structure and Glazing 285
Braces, Collar, Railings, and Brackets 288
Roof Covering 290
Roof Ventilator 291
Lightning Rod and Conductor 292
Details 293

Figures 295

THE LIGHT 312

Pedestal 312
Illuminating Apparatus 312

Figures 314

LIST OF FIGURES AND CREDITS

1. Fire Island Lighthouse and Keeper's Dwelling: south elevations. NPS photograph by Carole L. Perrault, 1982 viii

The First Fire Island Lighthouse: Remains

2. Remnants of the First Fire Island lighthouse. NPS photograph by Carole L. Perrault, 1982 18

3. First Fire Island lighthouse: stone and brick walls. NPS photograph by Carole L. Perrault, 1982 18

4. First Fire Island lighthouse: stone exterior wall. NPS photograph by Carole L. Perrault, 1982 19

5. First Fire Island lighthouse: brick interior wall. NPS photograph by Carole L. Perrault, 1982 19

The Second Fire Island Lighthouse: General Historical Figures

6. Fire Island Lighthouse and Keeper's Dwelling: east elevations, n.d. U.S. Coast Guard (USCG) negative #2415, Engineering Division, Third Coast Guard District, Governors Island, New York. Figure 6 is thought to be an original construction drawing, because the sketch includes features that differ from the as-built appearance of the structures. Specifically, the differences include the quantity of terrace buttresses, the dwelling's chimney detailing, and the decorative embellishment of the tower's neck 27

7. Plan of Fire Island Light Station, April 1868. USCG negative #3-lF-15, Engineering Division, Third Coast Guard District, Governors Island, New York 28

8. Map of Fire Island Beach, 1873. USCG negative #3-lF-20, Engineering Division, Third Coast Guard District, Governors Island, New York 29

9. Fire Island Lighthouse and Keeper's Dwelling: south elevation, 1874. *Harper's New Monthly Magazine*, No. CCLXXXVI, March 1874, Vol. XLVIII 30

10. Map of Fire Island Beach, April 1867, with comments dated November 14, 1884. USCG negative #3-IF-21, Engineering Division, Third Coast Guard District, Governors Island, New York 31

11. Fire Island Lighthouse and Keeper's Dwelling: south elevations, n.d. Courtesy of the National Archives, Washington, D.C., USCG photograph #26-LG-11-57. This photograph has been dated ca. 1886, because it shows the slate roof on the keeper's dwelling, which was replaced by a wood-shingle roof in 1887 32

12. Fire Island Lighthouse and Keeper's Dwelling: south and west elevations, n.d. Courtesy of the National Archives, Washington, D.C., USCG negative #26-LG-11-58. This photograph has been dated ca. 1886, for the same reason as cited for figure 11 33

13. Plan of Fire Island Light Station: buildings surveyed 1868, with additions dated February 20, 1888. USCG negative #3-lF-18, Engineering Division, Third Coast Guard District, Governors Island, New York 34

14. Map of Fire Island Beach, April 1867, with additions dated February 25, 1888. USCG negative #3-lF-17, Engineering Division, Third Coast Guard District, Governors Island, New York 35

15. Map of Fire Island Light Station, showing location of lifesaving station, 1891, but based on 1873 survey. USCG negative #3-Fl-3, Engineering Division, Third Coast Guard District, Governors Island, New York 36

16. Fire Island Lighthouse and Keeper's Dwelling: south elevation, February 16, 1891. USCG negative #3-lF-16, Engineering Division, Third Coast Guard District, Governors Island, New York 37

17. Fire Island Light Station, ca. 1892 and 1895. Sketch and photograph reproduced from the 1892 and 1895 *Light Lists*, published by the Lighthouse Board 38

18. Fire Island Light Station, n.d. Similar to photograph reproduced in the 1895 *Light List*. Courtesy of the National Archives, Washington, D.C., USCG photograph #26-LG-11-61 39

19. Fire Island Light Station: east elevations of the lighthouse and keeper's dwelling, 1898. Courtesy of the National Archives, Washington, D.C., USCG photograph #26-LG-11-62 40

20. Fire Island Lighthouse and Keeper's Dwelling: south and east elevations, August 12, 1900. Photograph by Anderson, Bay Shore, New York. Glass negative in the collection of the Suffolk Marine Museum. Fire Island NS (FIIS) copy negative #1908 41

21. Fire Island Lighthouse and Keeper's Dwelling: east elevations, n.d. Courtesy the Suffolk Marine Museum. FIIS copy negative #1909. This illustration has been dated between 1899 and 1902, because it shows the 1899 shutters partially intact, as well as the pre-1902 railing of the lower balcony 42

22. Map of Fire Island Beach: July 1902 survey, dated August 9, 1902. USCG negative #1372, Engineering Division, Third Coast Guard District, Governors Island, New York 43

23. Map of Fire Island Beach, 1904; made from plots of surveys dated April 1867 and July 1901. USCG negative #1370, Engineering Division, Third Coast Guard District, Governors Island, New York 44

24. Fire Island Light Station: south and west elevations of the lighthouse and keeper's dwelling, n.d. Courtesy of the Suffolk County Historical Society, Fullerton Collection, negative #2003 B. This photograph has been dated ca. 1905 by the Suffolk County Historical Society, based upon the known activity on Long Island of photographer Fullerton 45

25. Fire Island Lighthouse and Keeper's Dwelling: south and east elevations, n.d. Original photograph in the collection of the Suffolk Marine Museum. FIIS copy negative #1910. This photograph has been dated 1902-1911, because the 1902 railing of the lower balcony is in place, but the 1912 coating has not yet been applied 46

26. Fire Island Lighthouse and Keeper's Dwelling: south and east elevations, n.d. Original photograph in the collection of the Suffolk Marine Museum. FIIS copy negative #1911. The 1902-1911 date attributed to figure 25 has been assigned to this photograph as well, for the same reasons 47

27. Fire Island Lighthouse and Keeper's Dwelling: south and east elevations, n.d. Courtesy of the Peabody Museum of Salem, negative #3961. The 1902-1911 date attributed to figure 25 has been assigned to this photograph as well, for the same reasons 48

28. Plan of Fire Island Light Station: buildings surveyed November 1904 and June 1905, plan dated November 1908. USCG negative #3-lF-1, Engineering Division, Third Coast Division, Governors Island, New York 49

29. Fire Island Lighthouse and Keeper's Dwelling: north and east elevations, June 12, 1921. Original photograph in the collection of the Suffolk Marine Museum. FIIS copy negative #1907 50

30. Fire Island Lighthouse and Keeper's Dwelling: south and east elevations, n.d. Photograph gift of Sarah Hiddink, Fire Island National Seashore, 1980. This photograph has been dated from the 1920's to 1932, because the 1911 wood-shingle roof is present but weathered, and the 1931 skylight has not yet been introduced 51

31. Fire Island Light Station, looking southeastward, n.d. Courtesy of The Mariners Museum, Newport News, Virginia, negative #5514. This photograph has been dated 1931-1938, because the 1931 skylight is in place, but the chimneys have not yet been rebuilt, which occurred in 1938 52

32. Fire Island Light Station: south and east elevations of the lighthouse and keeper's dwelling, n.d. Courtesy of The Mariners Museum, Newport News, Virginia, negative #PL 346. This photograph has been dated 1931-1938, for the same reason that figure 31 has been attributed to that time 53

33. Plan of U.S. Naval Direction Finder Station at Fire Island, New York, showing conditions June 30, 1936. USCG negative #F925-S-85, Engineering Division, Third Coast Guard District, Governors Island, New York 54

34. Fire Island lookout tower inscription board, October 17, 1940. USCG negative #NY-83-457, Engineering Division, Third Coast Guard District, Governors Island, New York 55

35. Fire Island Light Station, looking southeastward, n.d. Courtesy of The Mariners Museum, Newport News, Virginia, negative #141960. This photograph has been dated to the early 1940's, because the 1938 chimney rebuilding has taken place, but the 1945 painting has not yet been undertaken 56

36. Fire Island Lighthouse and Keeper's Dwelling: west elevations, 1945. Photograph by Fred Fennikoh, USCG, when keeper of the light. FIIS negative #1161 57

37. Fire Island Lighthouse and Keeper's Dwelling: south and east elevations, 1945. Photograph by Fred Fennikoh, USCG, when keeper of the light. FIIS negative #1160 58

38. Map of Fire Island Light Station, showing underground electric service, March 29, 1948. USCG negative #NY-1282, Engineering Division, Third Coast Guard District, Governors Island, New York 59

39. Fire Island Light Station, looking northeastward, August 22, 1956. Courtesy of the U.S. Coast Guard Academy Library, New London, Connecticut 60

40. Fire Island Lighthouse and Keeper's Dwelling: south elevations, August 22, 1956. Courtesy of the U.S. Coast Guard Academy Library, New London, Connecticut 61

41. Fire Island Lighthouse and Keeper's Dwelling: east elevations, August 22, 1956. Courtesy of the U.S. Coast Guard Academy Library, New London, Connecticut 62

42. Fire Island Lighthouse and Keeper's Dwelling, looking southwestward, n.d. Courtesy of the USCG Public Affairs Division (G-APA), Washington, D.C. This photograph has been dated ca. 1960, when the tower was resurfaced 63

43. Fire Island Light Station, looking south-southwestward, 1981. USCG negative #110582-29, Public Affairs Division, Third Coast Guard District, Governors Island, New York 64

The Terrace and Outbuildings: Current Appearance

Unless otherwise noted, the following NPS photographs were taken by Carole L. Perrault in 1983.

44. Terrace: flagging stones 85

45. Terrace: concrete slab marking former privy location, north of tower 86

46. Terrace: paint locker, in northeast corner 86

47. Terrace: pump location, northwest of dwelling 87

48. Terrace: west embankment wall, with fence, stairway, and overgrowth. Photograph by Carole L. Perrault, 1982 88

49. Terrace: west embankment wall and chain-link fence around tower 88

50. Terrace: wooden and chain-link perimeter fences. Photograph by Lawrence A. Sorli, 1982 89

51. Terrace: south embankment wall, brickwork. Photograph by Carole L. Perrault, 1982 90

52. Terrace: south embankment wall, brick buttress 91

53. Terrace: east embankment wall, stonework. Photograph by Carole L. Perrault, 1982 92

The Tower: Historic Appearance

54. Tower: structural plan with sections, June 2, 1857. USCG negative #3-lF-6, Engineering Division, Third Coast Guard District, Governors Island, New York 115

55. Tower: drainage plan and section, March 22, 1962. Based upon figure 54. USCG drawing #03-2594, Engineering Division, Third Coast Guard District, Governors Island, New York 116

56. Tower: structural plan, ca. 1858. USCG negative #1379, Engineering Division, Third Coast Guard District, Governors Island, New York 117

57. Tower: plan for protective coating, April 17, 1912. USCG negative #5155, Engineering Division, Third Coast Guard District, Governors Island, New York 118

58. Tower: plan for reflector antenna brackets, September 12, 1958. USCG negative #03-1951, Engineering Division, Third Coast Guard District, Governors Island, New York 119

59. Tower: plan for resurfacing tower exterior, October 21, 1960. USCG negative #03-2235, Engineering Division, Third Coast Guard District, Governors Island, New York 120

60. Tower: drawings for new Watch Room doors and plexiglass storm windows, April 19, 1962. USCG drawing #03-2606, Engineering Division, Third Coast Guard District, Governors Island, New York 121

The Lantern: Historic Appearance

61. Details of a first-order lantern, August 1871. Drawing courtesy of the National Archives, RG 26. *Lighthouses*, Vol. 8, Plate 1-B 128

62. Details of a first-order lantern, August 1871. Drawing courtesy of the National Archives, RG 26. *Lighthouses*, Vol. 8, Plate 2-B 129

63. Section through lantern, Watch Room, and Service Room (plate 1), January 1894. USCG negative #1374, Engineering Division, Third Coast Guard District, Governors Island, New York 130

64. Sketch of alterations to Watch Room Floor and column (plate 2), January 1894. USCG negative #1375, Engineering Division, Third Coast Guard District, Governors Island, New York 131

65. Vertical section through lantern, Watch Room, and Service Room (plate 3), January 1894. USCG negative #3-IF-7, Engineering Division, Third Coast Guard District, Governors Island, New York 132

66. Plan of Watch Room and lower balcony (plate 4), January 1894. USCG negative #3-lF-8, Engineering Division, Third Coast Guard District, Governors Island, New York 133

67. Plan of lantern floor (plate 5), January 1894. USCG negative #3-lF-9, Engineering Division, Third Coast Guard District, Governors Island, New York 134

68. Details of Watch Room floor, July 24, 1894. USCG negative #1548, Engineering Division, Third Coast Guard District, Governors Island, New York 135

69. Lighting apparatus: Fire Island Lighthouse lens, 1896. Reproduced from *Electric Arc Lighting* by Edwin J. Houston and A.E. Kennelly, published by the W.J. Johnston Company, New York, 1896 145

70. Lighting apparatus: section and plan of first-order lens, revolving apparatus, and pedestal (sheet 1 of 3), September 20, 1932. USCG negative #7833, Engineering Division, Third Coast Guard District, Governors Island, New York 146

71. Lighting apparatus: plan of lens pedestal (sheet 2 of 3), August 31, 1932. USCG negative #7833, Engineering Division, Third Coast Guard District, Governors Island, New York 147

72. Lighting apparatus: details of pedestal doors and revolving apparatus (sheet 3 of 3), September 20, 1932. USCG negative #7833, Engineering Division, Third Coast Guard District, Governors Island, New York 148

73. Lighting apparatus: plan of temporary lens installation, September 20, 1932. USCG negative #7840, Engineering Division, Third Coast Guard District, Governors Island, New York 149

74. Lighting apparatus: Fire Island Fresnel lens, after 1932. Courtesy of The Mariners Museum, Newport News, Virginia, negative #PL 631 150

75. Lighting apparatus: Fire Island Fresnel lens, after 1932. Courtesy of The Mariners Museum, Newport News, Virginia, negative #PL 629 151

76. Lighting apparatus: diagram of motor drive for lens (sheet 1 of 3), August 1, 1938. USCG negative #8332, Engineering Division, Third Coast Guard District, Governors Island, New York 152

77. Lighting apparatus: diagram of motor drive for lens (sheet 2 of 3), August 1, 1938. USCG negative #8332, Engineering Division, Third Coast Guard District, Governors Island, New York 153

78. Lighting apparatus: diagram of motor drive for lens (sheet 3 of 3), August 1, 1938. USCG negative #8332, Engineering Division, Third Coast Guard District, Governors Island, New York 154

79. Lighting apparatus: section and plan of lamp stand, August 10, 1938. USCG negative #8336, Engineering Division, Third Coast Guard District, Governors Island, New York 155

The Lighthouse: Current Appearance

Unless otherwise noted, the following NPS photographs were taken by Carole L. Perrault in 1983.

80. Tower exterior: plinth with ventilation holes 178

81. Tower exterior: plinth, ventilation holes, and anchor 178

82. Tower exterior: west elevation. Photograph by Lawrence A. Sorli, 1982 179

83. Tower exterior: north elevation. Photograph by Lawrence A. Sorli, 1982 179

84. Tower exterior: neck decoration and lantern. Photograph by Lawrence A. Sorli, 1982 180

85. Tower exterior: grate for Watch Room vent box 181

86. Tower exterior: deteriorated coating and exposed brickwork. Photograph by Lawrence A. Sorli, 1982 182

87. Tower exterior: coating separating from brickwork at entrance 182

88. Tower exterior: deteriorated coating and exposed brickwork at Watch Room 183

89. Tower exterior: protective coating debris at base of tower 183

90. Tower exterior: paint sample #FIIS 13 P001, wall covered by coating 184

91. Tower exterior: paint sample #FIIS 13 P005, wall not covered by coating 185

92. Tower exterior: paint sample #FIIS 13 P008, spalled brick 186

93. Tower interior: brick wall 187

94. Tower interior: granite cornice in Service Room 188

95. Tower interior: wall ventilation holes at ground level 189

96. Tower interior: wall ventilation slots at upper levels 189

97. Tower interior: brick arch over doorway in sixth-landing room 190

98. Tower interior: typical brick arch over windows 190

99. Tower interior: brickwork around roundels 191

100. Tower interior: Watch Room vent box, open 192

101. Tower interior: Watch Room vent box, closed. Photograph by Carole L. Perrault, 1982 192

102. Tower interior: efflorescence of wall brickwork 193

103. Tower interior: deterioration of wall whitewash 194

104. Tower interior: deterioration of wall whitewash. Photograph by Lawrence A. Sorli, 1982 194

105. Tower interior: vertical crack in wall brickwork. Photograph by Carole L. Perrault, 1982 195

106. Tower interior: Watch Room, cracks in wall brickwork 196

107. Tower interior: paint sample FIIS 13 P018, wall at sixth landing 197

108. Tower interior: paint sample FIIS 13 P024, iron bar under partition at sixth-landing room 198

109. Tower interior: paint sample FIIS 13 P034, sixth-landing room, wall area recessed for stairway 199

110. Tower interior: paint sample FIIS 13 P047, Watch Room vent box 200

111. Tower interior: paint sample FIIS 13 P047, Watch Room vent box 201

112. Tower interior: underside of sixth-landing room floor 209

113. Tower interior: underside of Service Room floor, inside sixth-landing room 209

114. Tower interior: underside of Service Room floor, inside main stairwell 210

115. Tower interior: Service Room floor 210

116. Tower interior: paint sample #FIIS 13 P036, copper on Service Room floor 211

117. Tower interior: paint sample #FIIS 13 P041, wood of Service Room floor 212

118. Tower interior: Watch Room floor, threshold of doorway to lower balcony. Photograph by Carole L. Perrault, 1982 213

119. Tower interior: paint sample #FIIS 13 P042, wood where Service Room stairway reaches Watch Room 214

120. Tower interior: underside of lantern floor, inside Watch Room 215

121. Tower interior: peripheral flooring of lantern 216

122. Tower interior: peripheral flooring of lantern and deck of upper balcony. Photograph by Carole L. Perrault, 1982 216

123. Tower interior: paint sample #FIIS 13 P057, center floor plate of lantern 217

124. Tower interior: paint sample #FIIS 13 P058, underside of lantern floor 218

125. Tower interior: opening and trapdoor in Service Room floor 219

126. Tower interior: opening in lantern floor. Photograph by Lawrence A. Sorli, 1982 220

127. Tower interior: opening in lantern floor, traces of former trapdoor. Photograph by Carole L. Perrault, 1982 220

128. Tower interior: underside of main stairway 226

129. Tower interior: main stairway 227

130. Tower interior: underside of main stairway 227

131. Tower interior: central column 228

132. Tower interior: juncture of stairway treads with central column. Photograph by Lawrence A. Sorli, 1982 228

133. Tower interior: main stairway, girder of landing 229

134. Tower interior: main stairway, landing 229

135. Tower interior: main stairway, deterioration of steps 230

136. Tower interior: main stairway, deterioration of paint 230

137. Tower interior: paint sample #FIIS 13 P010, main stairway 231

138. Tower interior: main stairway, safety-line anchor 232

139. Tower interior: stairway in sixth-landing room 233

140. Tower interior: detail of stairway in sixth-landing room 233

141. Tower interior: paint sample #FIIS 13 P033, wall of sixth-landing room 234

142. Tower interior: stairway in Watch Room 235

143. Tower interior: underside of stairway in Watch Room 235

144. Tower interior: paint sample #FIIS 13 P045, Watch Room stairway 236

145. Tower interior: central column corrosion 242

146. Tower interior: central column, seam separation 243

147. Tower interior: paint sample #FIIS 13 P012, central column 244

148. Tower interior: paint sample #FIIS 13 P016, central column near sixth-landing room 245

149. Tower interior: top of central column in sixth-landing room 246

150. Tower interior: bottom of central column in sixth-landing room 246

151. Tower interior: conduits entering through entrance-doorway fanlight 247

152. Tower interior: conduits at ceiling of entrance hallway 248

153. Tower interior: conduits along central column 249

154. Tower interior: call-bell button, on central column at ground level 250

155. Tower interior: conduits in Watch Room 250

156. Tower interior: paint sample #FIIS 13 P014, conduit A 251

157. Tower exterior: entrance doorway. Photograph by Carole L. Perrault, 1982 257

158. Tower exterior: entrance-doorway fanlight. Photograph by Lawrence A. Sorli, 1982 258

159. Tower interior: entrance door, lock 259

160. Tower exterior: entrance door, key escutcheon and remnant of doorknob 259

161. Tower interior: entrance door, strap hinge and pintle 260

162. Tower interior: entrance doorway, east jamb area recessed for doorknob 260

163. Tower interior: paint sample #FIIS 13 P060, entrance door 261

164. Tower interior: doorway from main stairway to sixth-landing room 262

165. Tower interior: sixth-landing room, rim lock of door to main stairway 263

166. Tower interior: sixth-landing room, butt hinge of door to main stairway 263

167. Tower interior: paint sample #FIIS 13 P030, room side of sixth-landing room door 264

168. Tower interior: Watch Room doorway to lower balcony 265

169. Tower interior: Watch Room doorway to lower balcony, with early pintles and later hinges 265

170. Tower exterior: lower balcony doorway to Watch Room, with iron frame and evidence of early hardware 266

171. Tower exterior: arched window opening. Photograph by Lawrence A. Sorli, 1982 275

172. Tower interior: round window opening 275

173. Tower interior: arched-window frame and sashes 276

174. Tower interior: area of window frame between interior and exterior storm sashes 276

175. Tower interior: typical butt hinge for interior and exterior storm sashes 277

176. Tower interior: typical sash pull for interior sashes 278

177. Tower interior: typical sash pull for exterior storm sashes 278

178. Tower interior: typical wooden latch for interior sashes 279

179. Tower interior: typical hook to hold sashes open 279

180. Tower interior: bolt latch at top of exterior storm sashes 280

181. Tower interior: spring-necked bolt at bottom of exterior storm sashes 280

182. Tower exterior: paint sample #FIIS 13 P020, outer side of storm sashes 281

183. Tower interior: paint sample #FIIS 13 P021, trim for interior sashes 282

184. Tower interior: paint sample #FIIS 13 P025, interior sashes 283

185. Tower interior: paint sample #FIIS 13 P027, window frame 284

186. Tower interior: lantern posts and sills. Photograph by Lawrence A. Sorli, 1982 295

187. Tower interior: detail of lantern sill. Photograph by Lawrence A. Sorli, 1982 296

188. Tower interior: lantern sash bars. Photograph by Lawrence A. Sorli, 1982 297

189. Tower interior: lantern roof, junction of spider frame and lower frame. Photograph by Lawrence A. Sorli, 1982 297

190. Tower interior: lantern roof, spider frame, and suspension rods. Photograph by Carole L. Perrault, 1982 298

191. Tower interior: lantern roof, with lower frame, tie rods, and hub above plywood disk 299

192. Tower interior: lantern cornice area and stovepipe hole 299

193. Tower interior: lantern cornice area, deterioration of fittings 300

194. Tower interior: paint sample #FIIS 13 P002, lantern sill 301

195. Tower interior: paint sample #FIIS 13 P002, lantern sill 302

196. Tower exterior: diagonal brace bolted to deck of lower balcony 303

197. Tower exterior: diagonal brace at lower balcony. Photograph by Carole L. Perrault, 1982 304

198. Tower exterior: diagonal brace tied to deck of upper balcony 305

199. Tower exterior: diagonal brace bolted to side of lantern, and railing of upper balcony 305

200. Tower exterior: railing of lower balcony. Photograph by Carole L. Perrault, 1982 306

201. Tower exterior: evidence of earlier railing for lower balcony 307

202. Tower exterior: underside of deck of upper balcony, with bolt for railing 307

203. Tower exterior: reflector antenna bracket. Photograph by Carole L. Perrault, 1982 308

204. Tower exterior: antenna. Photograph by Carole L. Perrault, 1982 308

205. Tower exterior: lightning-rod cable at lower balcony 309

206. Tower exterior: lightning-rod cable at tower base 309

207. Tower interior: detail of bracket for lantern curtain 310

208. Tower interior: detail of bracket for lantern curtain 310

209. Tower exterior: detail of bronze handle 311

210. Tower interior: paint sample #FIIS 13 P050, Watch Room pedestal 314

211. Tower interior: extant lighting apparatus. Photograph by Lawrence A. Sorli, 1982 315

212. Tower interior: extant lighting apparatus. Photograph by Lawrence A. Sorli, 1982 315

CHAPTER 1.

ADMINISTRATIVE DATA

THE RESOURCE

Significance

The second Fire Island lighthouse and keeper's dwelling served as a navigational aid to vessels bound for New York Harbor from 1858 to 1973. Local, regional, and national significance is present in the history and architecture of these structures. This significance has been addressed thoroughly in their nomination to the National Register of Historic Places (App. C-160), and in the 1983 memorandum, "Recommended Treatments, Fire Island Light Station" (App. C-162). It therefore will not be reiterated here.

Location

Considered to be part of New York, Fire Island is a barrier island that stretches east and west off the southern coast of Long Island. It is 55 kilometers (32 miles) in length from Democrat Point on the west to Moriches Inlet on the east. Bordered on the south by the Atlantic Ocean and on the north by the Great South Bay, the shape and form of Fire Island is most directly a product of littoral drift, which has caused it to "migrate" westward about a mile every 25 to 30 years. The geomorphic evolution of Fire Island is discussed more thoroughly in a document review and archaeological reconnaissance performed for Fire Island National Seashore in 1977."[1]

The Fire Island Lighthouse and Keeper's Dwelling stand near the western end of the island, on the 118.6 acres commonly referred to as the Lighthouse Tract. This parcel of land, which is managed by the Fire Island National Seashore, lies between the eastern and western sections of the Robert Moses State Park. In 1826 the lighthouse site was situated at Fire Island Inlet; littoral drift has shifted the site approximately 5 miles westward of the current inlet. Constructed on the north side of Fire Island, the lighthouse has been logged at latitude 40° 37' 55" and longitude 73° 13' 09". Access to the site is by automobile across the Robert Moses Causeway.

Acquisition by the National Park Service

The Fire Island lighthouse was decommissioned as an active first-order light in December 1973. On April 10, 1981, 37.2 acres of land on Fire Island were transferred by the General Services Administration to the Department of the Interior, National Park Service (NPS). This land had been reported as excess to the needs of the Department of Transportation, U.S. Coast Guard, on June 8, 1979. The document of transfer (App. C-159) states the following:

> Pursuant to Public Law 95-625, approved November, 10, 1978, which expanded the boundaries of the Fire Island National Seashore, I hereby

[1] Elizabeth C. Righter, "Final Report on a Document Review and an Archaeological Reconnaissance of the William Floyd Estate and the Fire Island Lighthouse Tract, Fire Island National Seashore, Suffolk County, New York" (Jack McCormick & Associates, Inc., for the NPS, May 1977).

> transfer the aforementioned 37.2 acres of land together with the improvements thereon, described in the enclosed Exhibit "A", to the Department of the Interior. Also enclosed area map showing the property boundary and a copy of the Act of the State of New York granting this property to the Government. Included among the improvements on this property are a 167-foot-tall brick lighthouse, and a 2-story lighthouse keeper's quarters at the base of the structure, both of which were constructed in 1858 and have been determined eligible for inclusion in the National Register of Historic Places. In accordance with the provisions of Public Law 88-587, approved September 11, 1964, the property is transferred without reimbursement, with the concurrence of the Department of Transportation.

Although the site and structures were not placed completely under the jurisdiction of the U.S. Department of the Interior until the 1981 transfer, the presence of the National Park Service on the Lighthouse Tract dates to the early 1970's. The events leading up to the Park Service's acquisition of the lighthouse and keeper's dwelling are chronicled below, based upon information in Appendix C-162.

1971 the U. S. Coast Guard declared 81.4 unimproved acres of the Lighthouse Tract (not including the structures) excess property.

1972 the Fire Island National Seashore (NS) obtained a license from the Coast Guard to use the parcel and portions of the structures.

1973 the light was extinguished by the Coast Guard at midnight, December 31, 1973.

1974 consolidation of previous land-use licenses occurred. A five-year permit–extending from March 1, 1974, to January 31, 1979–gave the NS the use of the entire tract, reserving to the Coast Guard part of the keeper's dwelling until November 30, 1974, and part of a garage, which it gave up in 1983.

1978 Public Law 95-625 included the Lighthouse Tract within the boundaries of the Fire Island National Seashore, and custody of the 81.4 unimproved acres were transferred to the National Park Service on August 16, 1979.

Today, the Fire Island Lighthouse and Keeper's Dwelling are entirely managed by the Fire Island National Seashore. The administrative offices are located at 120 Laurel Street, Patchogue, New York, 11772. The structures are situated within the West District of the National Seashore, and are thereby the direct responsibility of the West District Ranger's Office established in the Annex Building, known as the "Checkpoint."

Current Condition

In 1966 the U. S. Coast Guard was already addressing the problem of the "scaling" concrete coating on the Fire Island lighthouse. Although a subject of extensive discussion, the condition was not physically remedied by the Coast Guard. Fifteen years later the National Park Service inherited, along with the historic structure, the problem of the exterior coating.

Currently, the lighthouse tower is abandoned. The protective coating, introduced in 1912, is experiencing an accelerated rate of deterioration; large sections are breaking loose due to bond failure. Presumably the bond failure is caused by differing rates of thermal movement between the brick structure and concrete coating. The sheer weight of the concrete is pulling the coating completely away from the wall, exposing the brick surface of the 1858 tower. The interior of the tower is plagued by high humidity levels, broken windows, and clogged ventilation and drainage cavities, resulting in extensive chipping of the painted finishes, efflorescence of the brickwork, and corrosion of the metalwork.

The keeper's dwelling provides residence for two NPS employees and their families at the present time. The dwelling was divided into two separate apartments during a ca.-1961 modernization program. This program altered the structure's interior more drastically in plan and architectural detail than at any other time in its history. The exterior was affected as well. The keeper's dwelling requires extensive maintenance work.

The terrace is in poor condition. The paving is loose and provides an uneven and dangerous walking surface. The embankment walls are covered with overgrowth, and plagued with cracks and deteriorated mortar joints.

Preservation Efforts

Alarmed by the condition of the tower and the site in general, a group of concerned citizens from the area approached the NPS about the preservation of the tower. Realizing that the NPS did not have the financial capability required to handle a project of such magnitude, the citizens founded the Fire Island Lighthouse Preservation Society, Inc., in 1982. The society chartered as a not-for-profit, tax-exempt corporation to raise funds for: (a) the restoration of the exterior of the lighthouse and keeper's dwelling; (b) relighting the light; and (c) adaptively reusing interior spaces for educational purposes. The funding for the writing of this historic structure report was generated through their efforts.

Archeology

In the mid-1970's the National Park Service awarded contract no. CX-2000-6-0019 to Jack McCormick & Associates, Inc., 511 Old Lancaster Road, Berwyn, PA, 19312, for archeological services to be performed on the Fire Island Lighthouse Tract. Elizabeth C. Righter, M.A., Senior Archeologist, became the prime investigator for this project. The results of the research were submitted May 1977 in the previously cited document review and archaeological reconnaissance for Fire Island National Seashore.[2] The report discusses the geomorphic formations of the island, the 1826 and 1858 lighthouses, and the archeological findings in the lighthouse tract of land.

[2] Righter, "Final Report."

MANAGEMENT POLICIES

Notwithstanding the active interest taken by the Fire Island Lighthouse Preservation Society, Inc., in the lighthouse and keeper's dwelling, the National Park Service owns the structures, and its policies apply to all decisions made concerning them.

List of Classified Structures Information

As designated historic structures, both the lighthouse and keeper's dwelling have been included in the National Park Service's List of Classified Structures (App. C-161). They were entered into the National Register of Historic Places on September 11, 1981 (App. C-160). The List of Classified Structure data is as follows:

Lighthouse tower: Park Number - 1750
Structure Number - HS13
Management Category - B

Keeper's dwelling: Park Number - 1750
Structure Number - HS14
Management Category - B

Management Category

National Park Service management has classified the Fire Island Lighthouse and Keeper's Dwelling as Category-B structures, as noted previously. According to the NPS' cultural resource management guideline, *Director's Order (D.O.) 28*, Release No. 5,[3] a structure must meet all of the following criteria to be identified as a Category-B structure:

- the structure meets National Register criteria individually or as part of a network, district, or multiple resource;
- the structure is not incompatible with primary park theme; and
- the structure must have a continuing or potential use benefiting the park or a leased operation based upon design, condition, location, and use.

The lighthouse and keeper's dwelling both comply.

[3] *D.O. 28: Cultural Resource Management Guideline*, Release No. 5 (Washington, D.C.: U.S. Department of the Interior, National Park Service, 1997).

General Management Plan

A general management plan (GMP) for Fire Island National Seashore was approved in 1978. This plan provides the framework upon which decisions regarding treatment and use are to be made. Broadly stated, the management plan recommends that the primary visitor activity on the Lighthouse Tract be that of "major historical interpretation and environmental education," without specifically identifying the type of treatment to be undertaken. The GMP deferred a final determination on this until completion of an historic structure report. Drawing upon the General Management Plan, the 1978 Approved Interpretive Prospectus, and research undertaken for this historic structure report, the following proposed treatment and use has been formulated for the lighthouse and its keeper's dwelling. Specific recommendations are more thoroughly treated in a memorandum entitled "Recommended Treatments, Fire Island Light Station" (App. C-162). That document was prepared after this historic structure report was written.

Proposed Treatment

The NPS' *D.O. 28* document states that Category-B structures should be preserved and maintained. Therefore, the Park Service proposes:

- to preserve, with limited "restoration," the exteriors of the lighthouse, keeper's dwelling, and terrace on which both sit, to an approved period; and

- to make the light operational.

Proposed Use

D.O. 28 indicates that Category-B structures can be used for park-support activities or else leased for original or adaptive use. The GMP recommends that the keeper's dwelling "be used as a small maritime museum, interpretive center, and information center." Thus, the Park Service proposes:

- to adaptively use the interiors for educational programs and exhibits that will interpret the history and environment of the surrounding area; and

- to lease portions of the historic property, in accordance with the guidelines described in *D.O. 28*, Chapter 8, pages 133-134. It is thought that leasing the structure would help ensure the viability of the restoration program.

Designation of an Historic Period

Mention has been made of the fact that the Park Service intends to preserve and restore the exterior of the structures to an "approved period." The determination of this "approved period" is a complex task, for several reasons. Historically, no one period of use significantly stands out as being more important than another. Architecturally, substantial changes–repairs and alterations–have been made to the structures throughout their history, affecting quite dramatically their appearance. And physically, the condition of both the lighthouse and keeper's dwelling, as described earlier, requires certain conservation treatments to ensure their longevity–treatments not necessarily compatible with a particular restoration period. Faced with these facts, the ultimate restoration decision will undoubtedly reflect compromise and inconsistency.

Three distinct dates emerged during the research for this report as viable restoration periods for the exterior of the structures. These are listed as follows, along with the general appearance of the structures at those times.

1858 - 1859: Original Construction

tower: thin wash coatings of "cement"; completely painted yellow-cream, shaft neck detailing exposed; balcony railings different from those of today; Fresnel lens in situ

covered passageway: in place

keeper's dwelling: slate roof; four chimneys; entryways and doors treated differently than today; window sashes generally six-over-six, double-hung

1939: The Modern Period (advent of U.S. Coast Guard management, electrification)

tower: 1912 concrete coating extant, with black and white stripes (design was introduced in 1891); balcony railings from the early 1900's in situ; 1911 Watch Room door; new light apparatus in place

covered passageway: in use; painted white (dark sashes), with asphalt-shingled roof

keeper's dwelling: red asphalt-shingled roof; only two chimneys on jerkinhead peak (rebuilt 1938); skylight introduced ca. 1932; windows generally with two-over-two, double-hung sashes

1973: The Last Service Year (light was extinguished at midnight, December 31, 1973)

tower: as described in 1939, but radio antenna brackets have been placed on the lantern (ca. 1958); 1960's Watch Room door; plexiglass covering windows

covered passageway: missing (ca. 1950)

keeper's dwelling: roof, with different pattern of asphalt shingles; entryways and doors substantially altered (new, modern doors extant, selected windows and doorway openings partially or completely closed off), new north vestibule (1961) in place of the covered passageway

Selection of the 1858-1859 original construction date as the restoration period would require a substantial amount of restoration. There is not enough information to guide such work, and even if there were, it would mean the removal of many layers of history. This alternative is the least favorable.

The 1973 date would reflect the entire continuum of the Fire Island Light Station's past, and would require only minimal restoration work. However, the proposed plan is to adaptively reuse the interiors of the structures for educational and museum purposes. It would be desirable to have the covered passageway extant, and all the doorways and windows open, for this use.

The 1939 date represents a compromise period that seems to be the best solution. The covered passageway could be rebuilt, and all the doorways and windows brought back to full use. Only limited restoration would be prescribed. Therefore, the memorandum "Recommended Treatments, Fire Island National Seashore" (App. C-162) states: "A restoration to 1939 offers the most significant interpretive opportunities, best serves the structures, and satisfies management needs."

Whichever period is selected, the exterior detailing may not be compatible with the historic date. For conservation purposes, a coating thinner than that of 1912 must be instituted. How this coating may affect the architectural detailing is uncertain at the moment, because the state of the shaft's brickwork is not known.

ORGANIZATION OF THE HISTORIC STRUCTURE REPORT

The level of historic structure investigation performed on the Fire Island Lighthouse and Keeper's Dwelling as Category-B structures is classified as thorough. *D.O. 28* (p. 18) describes this level of investigation as follows:

> For historical studies this means research in selected published and documentary resources of known or presumed relevance that are readily accessible without extensive travel and that promise expeditious extraction of relevant data, interviewing all knowledgeable persons who are readily available, and presenting findings in no greater detail than required by the task directive.... For architectural and landscape studies it means nondestructive investigation using all appropriate technical means (usually in response to a preservation management objective.

The thrust of the investigation of the lighthouse and keeper's dwelling became one of data collection for three reasons:

- a period of restoration/preservation had not been selected prior to the research;
- the keeper's dwelling is still occupied, which precluded any destructive investigation in the form of removal of architectural fabric; and
- time constraints.

Extensive documentary research was accomplished in conjunction with this report, as described in Appendix A.

The report was researched and designed to be a tool for planning. The data included here is arranged primarily to aid the historical architect, architectural conservator, and exhibit specialist in the preparation of specifications and working drawings to be employed in the preservation, and adaptive use of the Fire Island Lighthouse and Keeper's Dwelling.

The prime focus of this report is architectural, rather than historical. Historical data has been included only as it pertains to understanding the evolution of the structures architecturally. The history of ownership and management of the site has been briefly discussed, but social history has been excluded.

The three principal components of the site–the terrace on which the buildings sit, the lighthouse tower with its lantern, and the keeper's dwelling–are treated in six chapters (nos. 3-8), two per component. The first chapter on each component discusses its development over time. The second chapter on each component describes the current status of all architectural elements comprising the component, and lists the figures and paint samples related to each element. Following the descriptions of the most important elements are short historical-background sections designed to put the current situations into historical perspective.

The text of the report has been heavily illustrated, with figures interspersed throughout the study. The appendices have been broken down into six sections:

Appendix A - a discussion of research sources investigated during documentary research;

Appendix B - documentary data related to the first Fire Island lighthouse;

Appendix C - documentary data related to the second Fire Island lighthouse;

Appendix D - general documentary data on lighthouses not related specifically to the Fire Island lighthouse;

Appendix E - a discussion of the paint-analysis methodology; and

Appendix F - a discussion of the mortar-analysis methodology.

The numerous documents comprising Appendices B and C have been numbered. The documents are referenced in the text by the appendix letter and number (e.g., "App. B-1").

CHAPTER 2.

GENERAL HISTORY

BACKGROUND

The history of the Fire Island lighthouses intricately reflects the history of the lighthouse system and its legislation. The erection of both lighthouses, the first in 1825-1826 and the second in 1858-1859, occurred during significant periods of lighthouse expansion and reorganization. Several sources included in Appendix A provide a historical overview of the United States lighthouse system from the initial legislation in 1789 to the present; these can be consulted for a more detailed account of the administrative history. For purposes of this study, only the historical highlights of the system directly related to the Fire Island lighthouses will be discussed, beginning with the enabling legislation.

The first act of Congress delegating to the Federal government jurisdiction over the United States aids to navigation was passed August 7, 1789, stipulating the following:

> All expenses which shall accrue from and after the 15th day of August, 1789, in the necessary support, maintenance, and repairs of all lighthouses, beacons, buoys, and public piers, erected, placed or sunk before the passing of this act, at the entrance of or within any bay, inlet, harbor, or port of the United States, for rendering the navigation thereof easy and safe, shall be defrayed out of the Treasury of the United States.

Prior to this action, the states controlled and supported the aids to navigation and commerce within the United States. Additional legislation was generated in the following years that further delineated the federal government's control over the aids to navigation. By the 1820's, the Treasury Department was overseeing completely the construction of new lighthouses, one of which was the first Fire Island lighthouse.

THE FIRST FIRE ISLAND LIGHTHOUSE

The Land Title

On April 20, 1825, an act was passed vesting in the United States exclusive jurisdiction over land in Suffolk County, New York, for lighthouse purposes (App. B-1). The Collector and Superintendent of Lighthouses was the force behind this act, as described in a letter to the Fifth Auditor of the U.S. Treasury Department, June 15, 1825 (App. B-4):

> Your letter of the 15th March last was duly received agreeably to your directions I located the site for the Light House, on the east side of Fire Island Inlet, but was unable to obtain a title to the land by purchase as there was doubt who were, if any person was the owner thereof. I therefore made application to the State Legislature to a cession of the jurisdiction over it and for Commissioners to appraise the value of the land which was granted. The Commissioner have valued same at fifty dollars which I have paid, and have received for the United States a certified copy of the Act and a duplicate of the Appraisement which has been recorded all of which make a good and sufficient title to the land. I had previously caused it to be surveyed and land mark put up. I herewith, transmit a plan of the building for the Light House and Dwelling which I consider necessary (the land being a low beach).

The title to the land was issued on May 7, 1825 (App. B-2). Appendix document B-3 features the May 1825 title, but it is typed with additional certification dated November 1854 and December 1920.

Construction

The details of the construction history and the design of the first Fire Island lighthouse will not be discussed, since the subject of this report is the second Fire Island lighthouse, and since other sources provide a thorough discussion of the first lighthouse. Included in Appendix B for reference are the surviving construction documents, as follows:

Appendix B-5 (dated July 23, 1825) - advertisement for Proposals for Light House on Fire Island Inlet;

Appendix B-6 (dated August 22, 1825) - contract with Haviland Wicks for the erection of the Fire Island lighthouse; and

Appendix B-7 (dated September 30, 1825) - contract with George W. Thompson for furnishing and outfitting the Fire Island lighthouse.

The lighthouse was constructed in 1825 with a $10,000 appropriation. It was octagonal in shape, and built of stone. The specifications called for the use of "Connecticut River blue split-stone," but the stone rubble at the former tower site appears to be gneiss. A keeper's dwelling was to be built of the same bluestone. No part of that structure remains in situ.

The lighthouse was put into service in 1826. The specifications state that it exhibited 14 lamps with 21-inch reflectors for the revolving light. Standing 89 feet, 3 inches above sea level, the tower's light was visible for 14.5 nautical miles under "ordinary atmospheric conditions." Appendices B-8 through B-13 describe problems with the clock and illuminating apparatus, dating to the 1850's. Apparently, a new illuminating apparatus was installed in 1854, and repairs were made again two years later.

In 1852, a recommendation came from the Lighthouse Board to increase the height of the tower and equip it with the "most powerful lens apparatus that can be procured." This plan was never realized, and a second plan emerged.

Demolition

The stone octagonal pyramid tower had outlived its usefulness, it was thought. Funds were appropriated for rebuilding the Fire Island lighthouse in March 1857. A site was chosen approximately 200 yards to the northeast for the construction of a second tower. This new lighthouse would support a first-order lantern fitted with a Fresnel lens. Figures 8 and 9 are site plans that show both lighthouses. The intent was to reuse the stone from the 1825 lighthouse and dwelling in the new dwelling accompanying the second tower. Two letters make reference to the demolition and reuse of the first tower and dwelling. Appendix C-57, dated August 14, 1858, is a letter from the engineer to the secretary of the Lighthouse Board describing the proposal to reuse the stone in the foundation of the new dwelling. Appendix C-58, a letter written two days later, is an order by the board to notify the keeper to vacate the house when required by the engineer. Demolition of the tower and dwelling presumably commenced in the late autumn of 1858.

Archeological Remains

Today all that remains above ground of the first Fire Island lighthouse and its keeper's dwelling are several feet of the tower (figs. 2-5). The archeological remains are described in the May 1977 "Final Report on a Document Review and an Archeological Reconnaissance of the William Floyd Estate and the Fire Island Lighthouse Tract, Fire Island National Seashore, Suffolk County, New York."[1]

[1] Elizabeth C. Righter, "Final Report on a Document Review and an Archaeological Reconnaissance of the William Floyd Estate and the Fire Island Lighthouse Tract, Fire Island National Seashore, Suffolk County, New York" (Jack McCormick & Associates, Inc., for the NPS, May 1977), pp. 44-48.



Figure 2. Remnants of the first Fire Island lighthouse (1982).

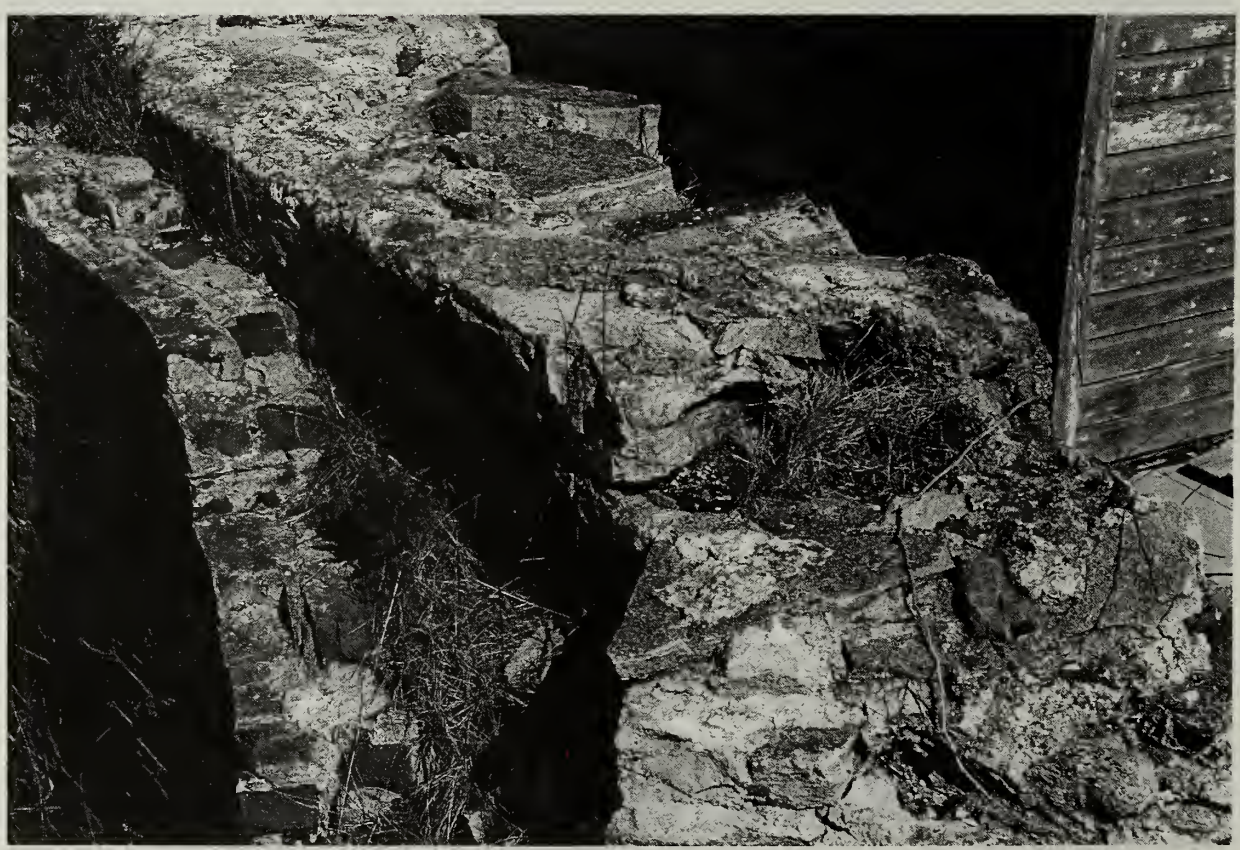


Figure 3. First Fire Island lighthouse: stone and brick walls (1982).



Figure 4. First Fire Island lighthouse: stone exterior wall (1982).

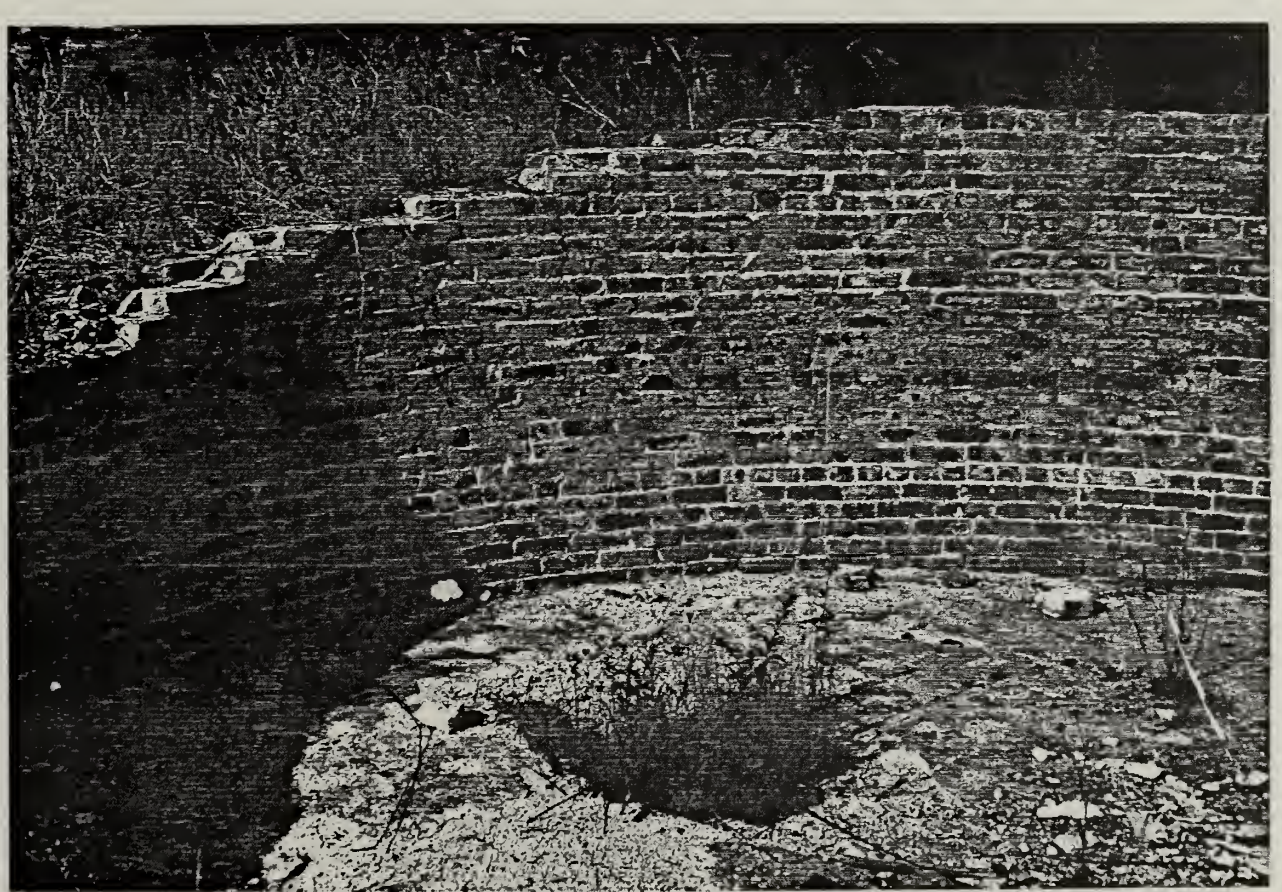


Figure 5. First Fire Island lighthouse: brick interior wall (1982).

THE SECOND FIRE ISLAND LIGHTHOUSE

Legislation

The initial lighthouse legislation responsible for the eventual construction of the second Fire Island lighthouse dates to 1851. Congress in March of that year "authorized and required" that the Secretary of the Treasury formulate a board to analyze the state of the lighthouse system in the United States, and to make suitable recommendations for improvement based upon the advancements in aids to navigation being employed in Europe. The report of the committee initiated substantial reform, including the Congressional action of October 9, 1852, which created a nine-member Lighthouse Board composed of both military officers and civilians. The country was divided into 12 districts. To provide on-site professional supervision of the lighthouses, an inspector was assigned to each district. One particularly important result of the reform was the introduction of the highly lauded Fresnel system of lenses.

By the time the second Fire Island lighthouse was built, the workload for the districts' inspectors had become so heavy that an engineer also was appointed for each district. The inspectors were from then on all naval officers, who could best handle the daily supervision of the lighthouses within their districts. The engineers were all army engineers, and were responsible chiefly for repairing and rebuilding lighthouses within their districts. Inspectors and engineers had to make monthly and annual reports to the Lighthouse Board. The board itself published an annual report.

Among the goals of the newly formed Lighthouse Board was the project to make travel "easy and safe" into the port of New York. The intent was to have New York emerge as the most important American port in the transatlantic trade, with Fire Island becoming the most important light station on the East Coast, since it was the first landfall for ships approaching New York harbor. Thus, the rebuilding of the Fire Island lighthouse was a critical element in the Lighthouse Board's plan, as summarized in the board's 1857 annual report:

> Upon completion of the first class tower at Fire Island, now under construction, and which it is expected will be finished early next season, there will be three first class light-houses fitted with first-order lens apparatus, properly distinguished, on the seacoast of Long Island from Montauk Point to the entrance to New York, a distance of about 120 miles, which will render the navigation along the coast, with ordinary care and precaution, entirely "easy and safe."

As built, the second Fire Island lighthouse was almost 80 feet taller than its predecessor, and had a more powerful light. It was also higher than neighboring lights to the east and west.

Design

With the reorganization of the lighthouse system in the United States during the 1850's, the federal government made an increasingly concerted effort to standardize lighthouse construction features. The newly founded Lighthouse Board produced published specifications and standard drawings for generic types of structures, such as a brick tower or a first-order lantern. These plans

were made available to the district engineers. The engineers would incorporate the relevant elements of the plans into their project, with the final approval for the design coming from the Lighthouse Board.

The second Fire Island Lighthouse and keeper's dwelling exhibit certain standard features, but ultimately they are actually a blend of many factors, including the appropriation level, the availability of building materials, the requirements of the local environment and terrain, and the design preferences of the engineer in charge.

Function

The prime reason for the Fire Island lighthouse's existence was to serve as an aid to navigation. Throughout the 19th and early 20th centuries the lighthouse played a significant and indispensable role in guiding transatlantic vessels along the Atlantic Coast. The lighthouse was recognized for its strategic position in the annual report for 1894: "This is the most important light for transatlantic steamers bound for New York. It is generally the first one they make and from which they lay their course." In 1908, this critical role was stressed in a petition to the Lighthouse Board, issued by steamship companies and marine insurance companies, for bringing the light at Fire Island up to the highest standard of lights on the coast. The companies' petition (App. C-114) represented their case as follows:

> That it has been the enlightened policy of the United States Government to meet the requirements of the growing traffic of the Port of New York by providing for the safety and accessibility of the approaches and channels of this harbor;
>
> That the light on Fire Island is the objective point which is made by all vessels approaching New York Harbor from the East after making Nantucket South Shoal Light-Vessel;
>
> That it is of the greatest importance to the safety, and the uninterrupted course, of navigation that the light on Fire Island should be of a character equal to that of the best lights in existence elsewhere....

The Fire Island lighthouse played this part throughout the early years of the 20th century. By the late 1930's, however, lighthouses in general were being slowly replaced by advanced technology in the field of navigational aids. In 1973, the second Fire Island lighthouse succumbed to the fate of the first Fire Island lighthouse–it had outlived its usefulness. The lighthouse was decommissioned, and the light went dark at midnight on December 31, 1973.

The Fire Island Light Station participated in secondary functions throughout its history, as follows:

Lifesaving Service. The U.S. Lifesaving Service maintained a station at Fire Island beginning in 1859, the year authorization for the same was obtained. The first formal station building was erected in 1878; in 1881, the service was directed to move it onto lighthouse property. In 1886, the station's boathouse also was moved onto the property, and the station itself was again moved elsewhere on the property in 1893. The Lifesaving Service merged with the U.S. Coast Guard in 1915, and on June 9, 1920, the U.S. Secretary of Commerce

gave permission to the Coast Guard at Bay Shore, NY, to use part of the Fire Island Light Station Reservation as a site for Coast Guard Station No. 83.

Western Union Telegraph Station. A telegraph station was constructed between 1868 and 1870 by the Western Union Company. The Lighthouse Board authorized the installation of the Western Union telegraph apparatus in the lighthouse. It was installed on January 2, 1878. The building was destroyed on September 21, 1938, by a hurricane.

Telephone Service. A telephone connection was established between the light station and the lighthouse engineer's office on May 5, 1898, as a result of a special Congressional appropriation for national defense.

Wireless Telegraphy. A series of experiments in wireless telegraphy was made at this station by the Signal Officers of the War Department; permission to use the building and grounds for the purpose was granted by the board September 15, 1899.

Naval Radio Direction Finder Station. Around 1906 the U.S. Navy received a permit to occupy sections of the light station to establish such a radio station. In 1941 the Naval Direction Finder Station was turned over to the Coast Guard.

Radio Towers. Between 1937 and 1939 numerous radio towers were constructed on the site. A 300-foot-tall radio tower was introduced with capability of reaching from Labrador to the Gulf of Mexico. A radio-beacon tower was erected on the south beach ca. 1939. It broadcast a signal of 286 kilocycles, as an aid to mariners. This was one of three stations, in sequence, by which ships could get bearings. During World War II, the Voice of America was broadcast from the light station.

International Nickel Company Experiments. In 1937 the International Nickel Company, Inc., of Delaware was granted permission to occupy and use for five years a section of the Fire Island Lighthouse Reservation for establishment of a test station to conduct "a program of atmospheric weathering tests of sheet metals." The facility occupied about 3.7 acres southwest of the lighthouse.

Pertinent Administrative Actions

Francis Ross Holland, Jr., offers a thorough and well-documented discussion of the history of the administration of lighthouses in his book *America's Lighthouses*.[2] This volume is recommended for more detailed information on the topic. Only the related administrative actions affecting the second Fire Island lighthouse are included here. This includes general lighthouse legislation as well as specific actions.

1852 - the Lighthouse Board was established under the Treasury Department.

1903 - jurisdiction over lighthouses was transferred to the Commerce Department.

[2] Francis Ross Holland, Jr., *America's Lighthouses* (Brattleboro, VT: The Stephen Greene Press, 1972).

1910 - the Bureau of Lighthouses was created, and the Lighthouse Board was abolished.

1931 - a Presidential Reorganization Act abolished, "in the interest of economy and efficiency," the Lighthouse Service. Its activities were taken over by the U.S. Coast Guard, and the Lighthouse Board ceased to exist July 7, 1939. Management of the Coast Guard since that time has passed from the Commerce Department to the Treasury Department, then to the Transportation Department, where it is today.

1970's - the Coast Guard transferred management of the Lighthouse Tract to the National Park Service in the early 1970's.

1981 - the National Park Service assumed complete jurisdiction over the lighthouse and keeper's dwelling.

The Second Fire Island Lighthouse: General Historical Figures

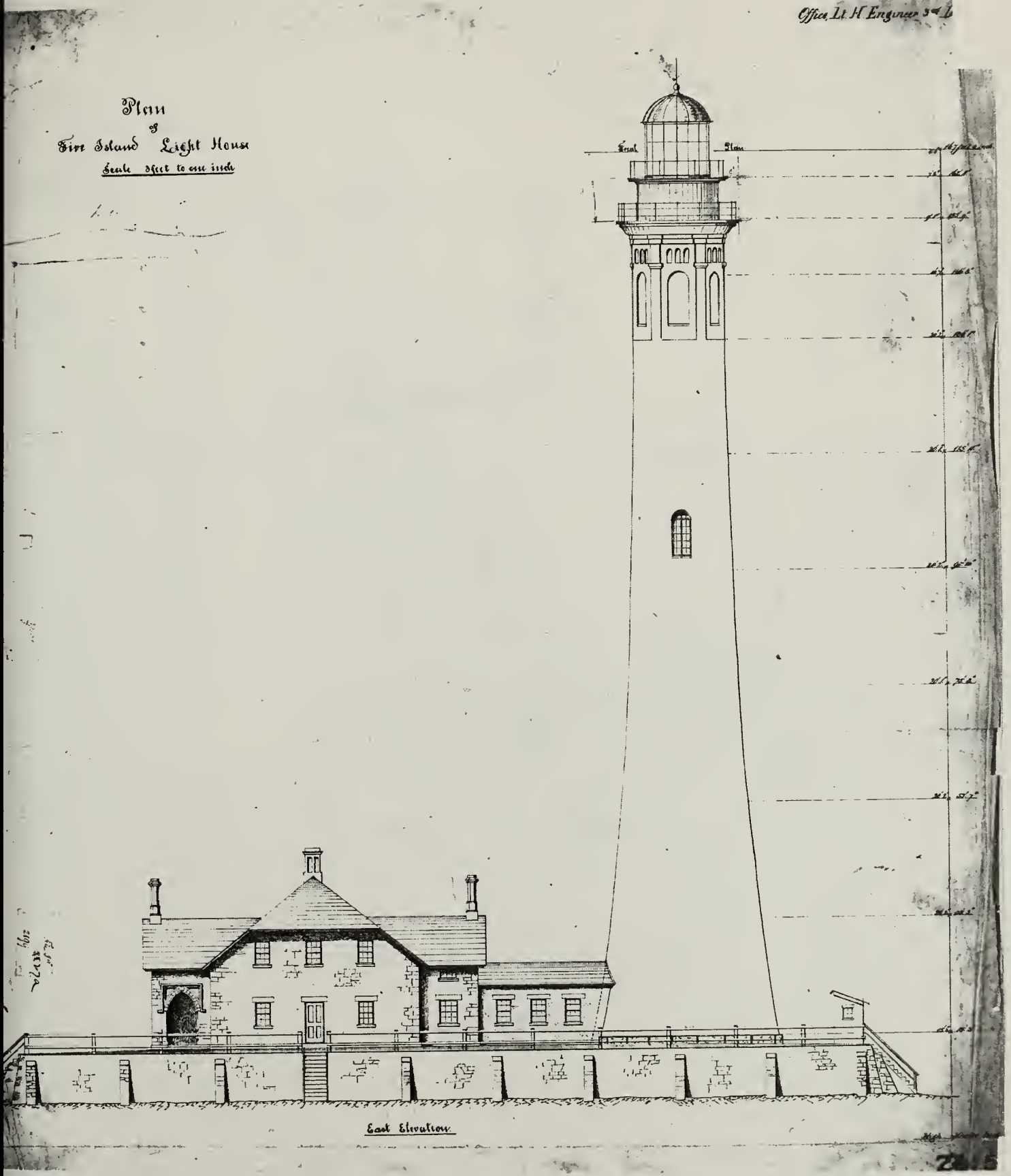


Figure 6. Fire Island Lighthouse and Keeper's Dwelling: east elevations, ca. 1857.

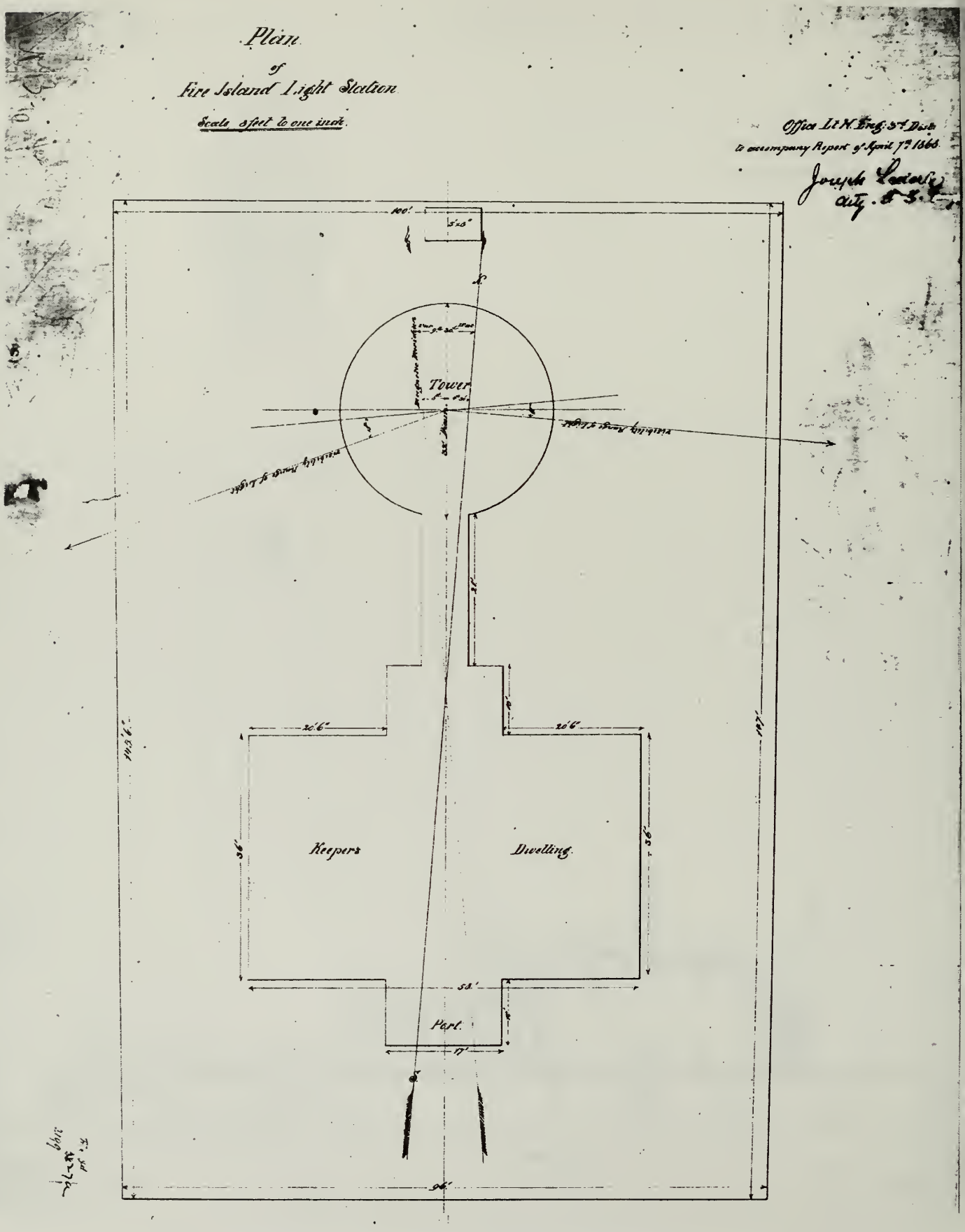


Figure 7. Plan of Fire Island Light Station, April 1868.

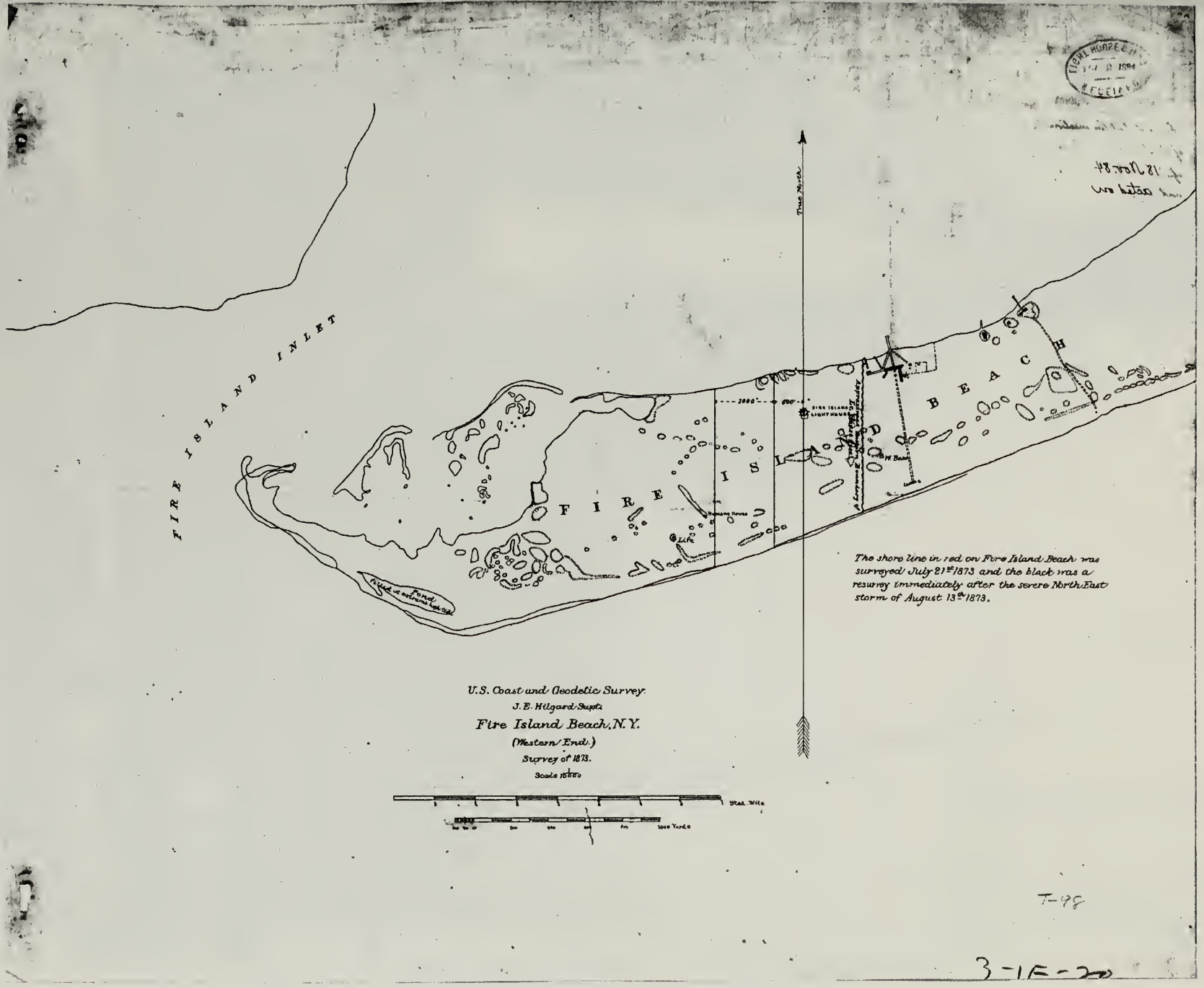
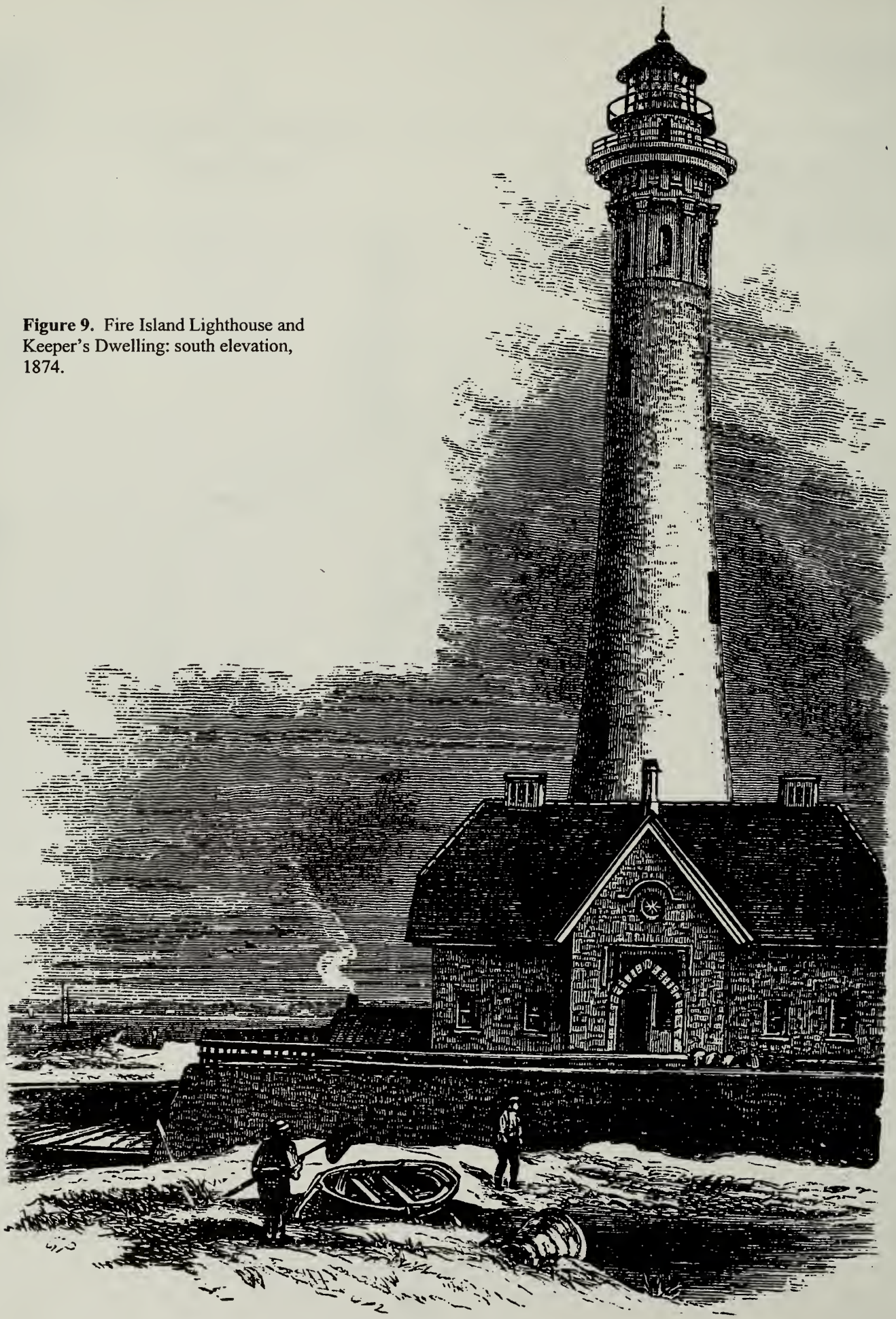


Figure 8. Map of Fire Island Beach (1873).

Figure 9. Fire Island Lighthouse and Keeper's Dwelling: south elevation, 1874.



FIRE ISLAND LIGHT, NEW YORK.

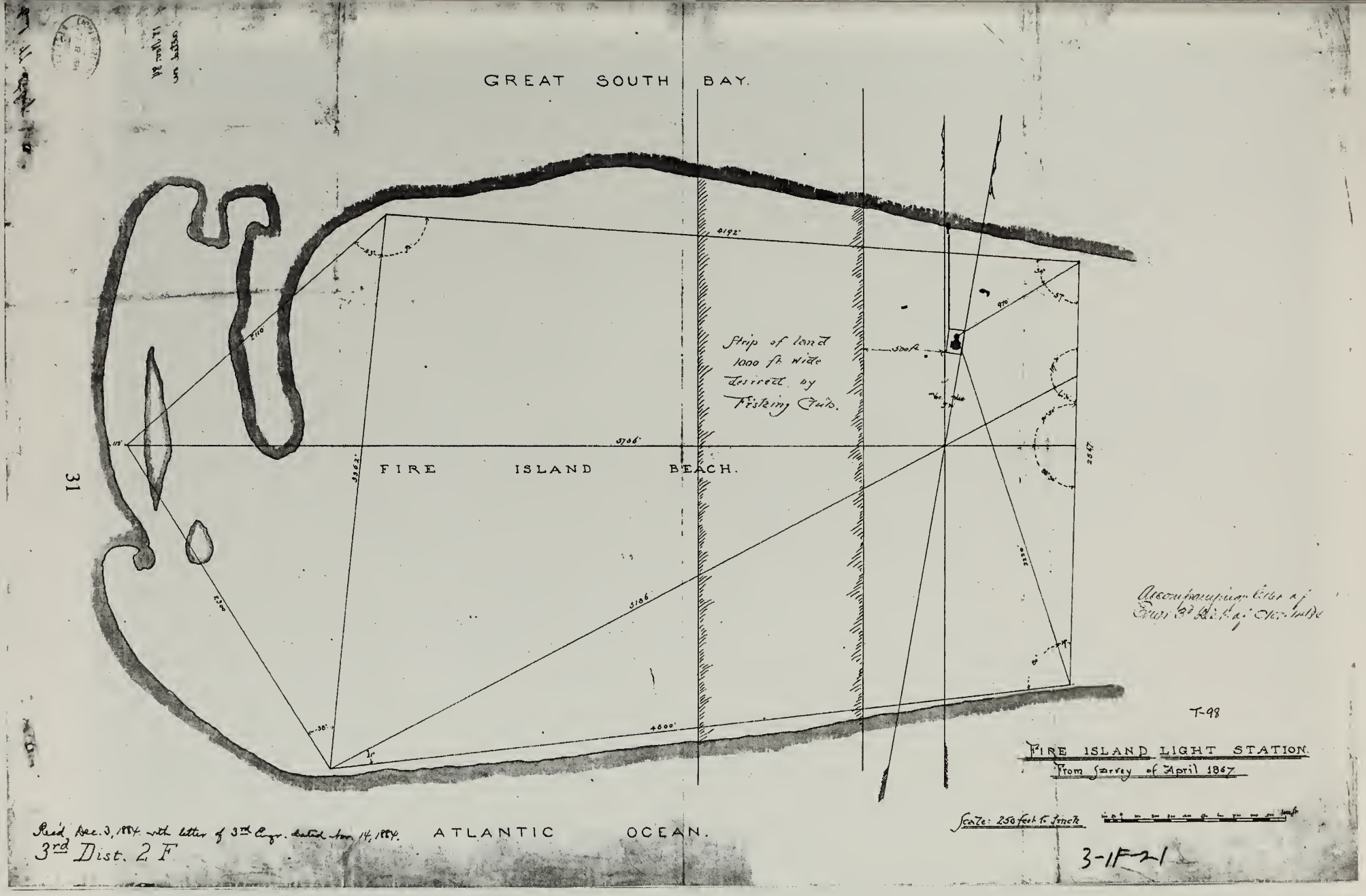


Figure 10. Map of Fire Island Beach, April 1867, with comments dated November 14, 1884.



Figure 11. Fire Island Lighthouse and Keeper's Dwelling: south elevations, ca. 1886.



Figure 12. Fire Island Lighthouse and Keeper's Dwelling: south and west elevations, ca. 1886.

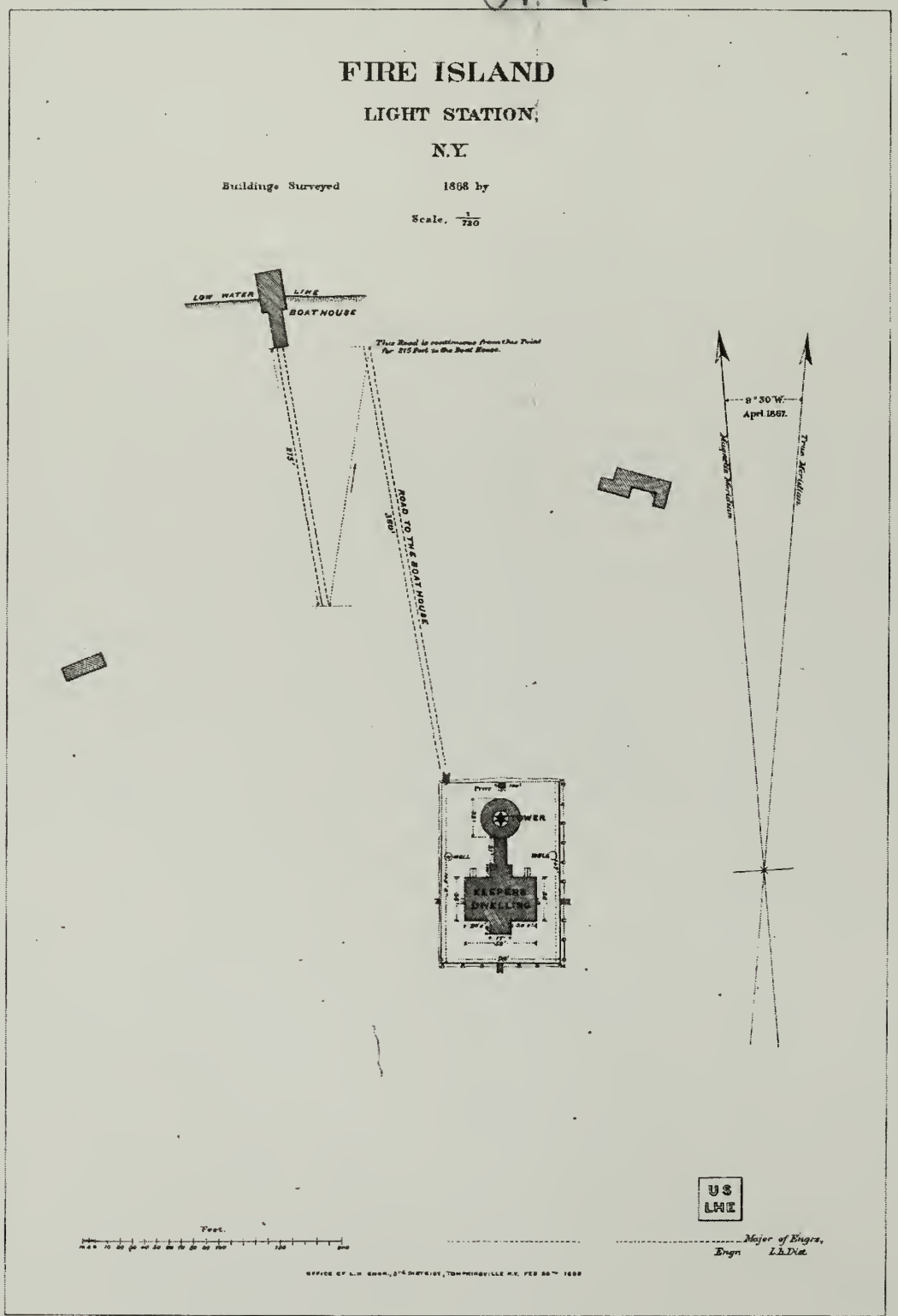
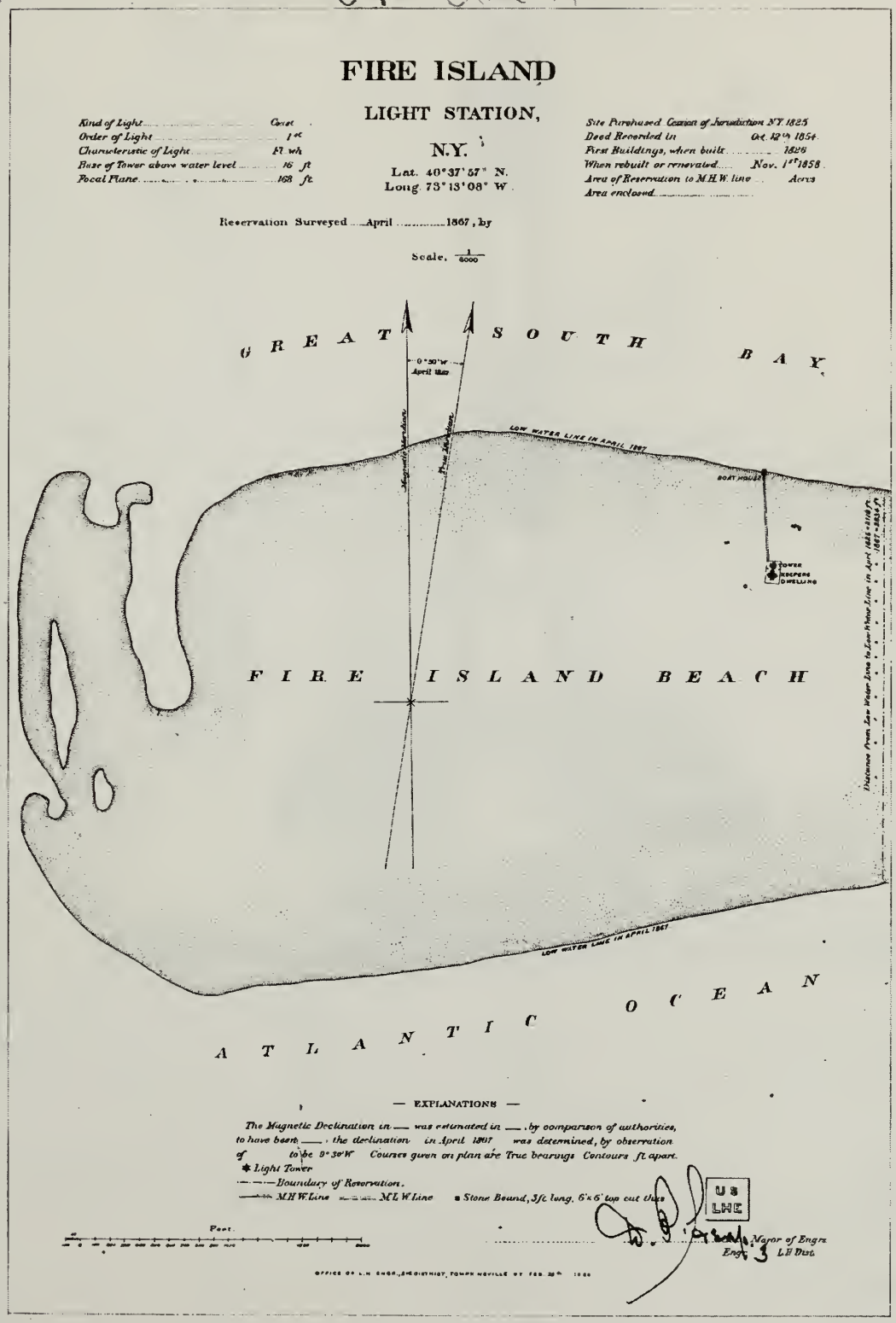


Figure 13. Plan of Fire Island Light Station: buildings surveyed 1868, with additions dated February 20, 1888

Encl 132 LIGHT HOUSE BOARD SEP 3 1888 2d Engr

No 40

New York '1



T-98

3d Dist.

2 F. with Engr's letter of 3d Sept. '89 — 35
filed 6th

3-1F-17

Figure 14. Map of Fire Island Beach, April 1867, with additions dated February 25, 1888.

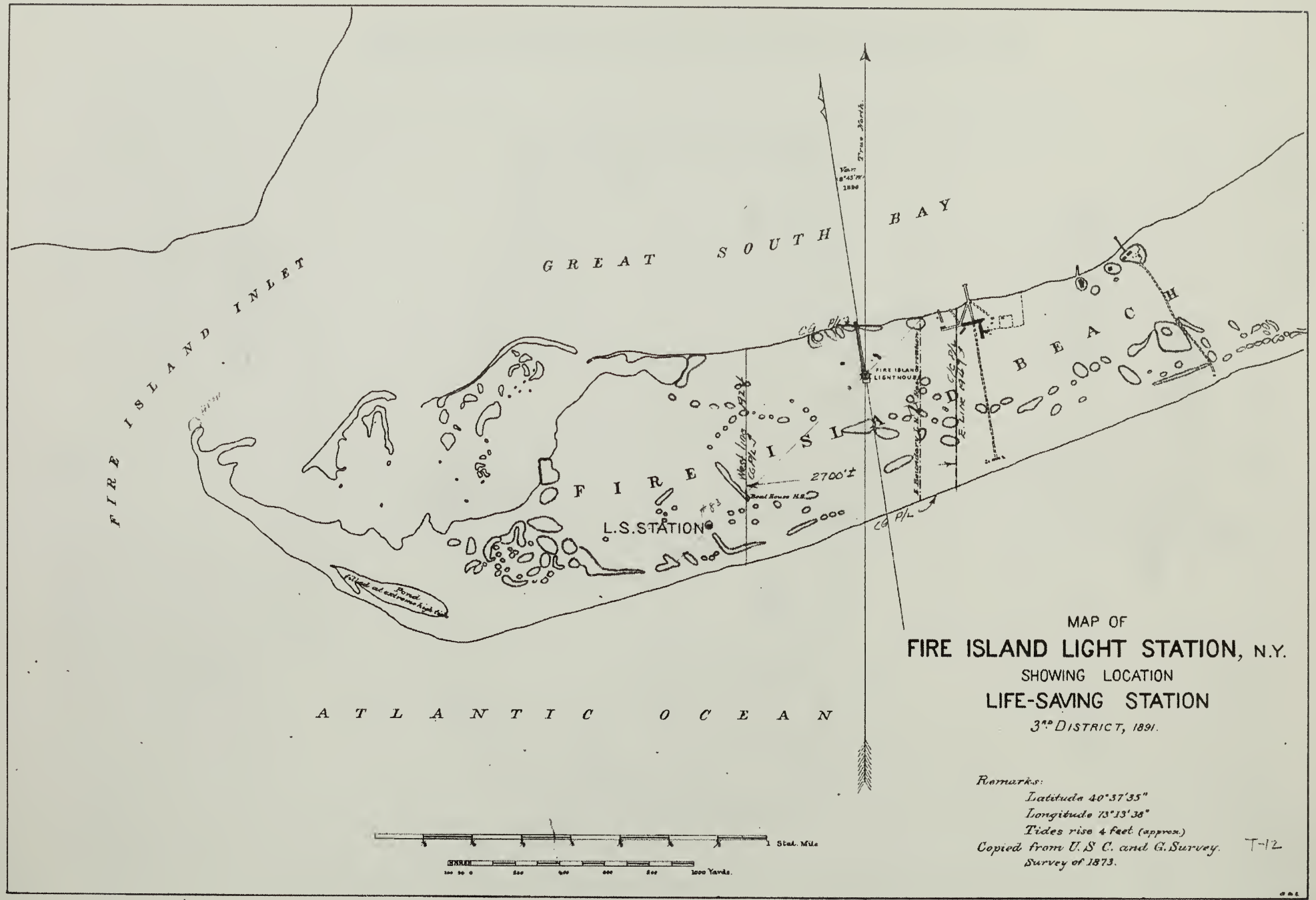
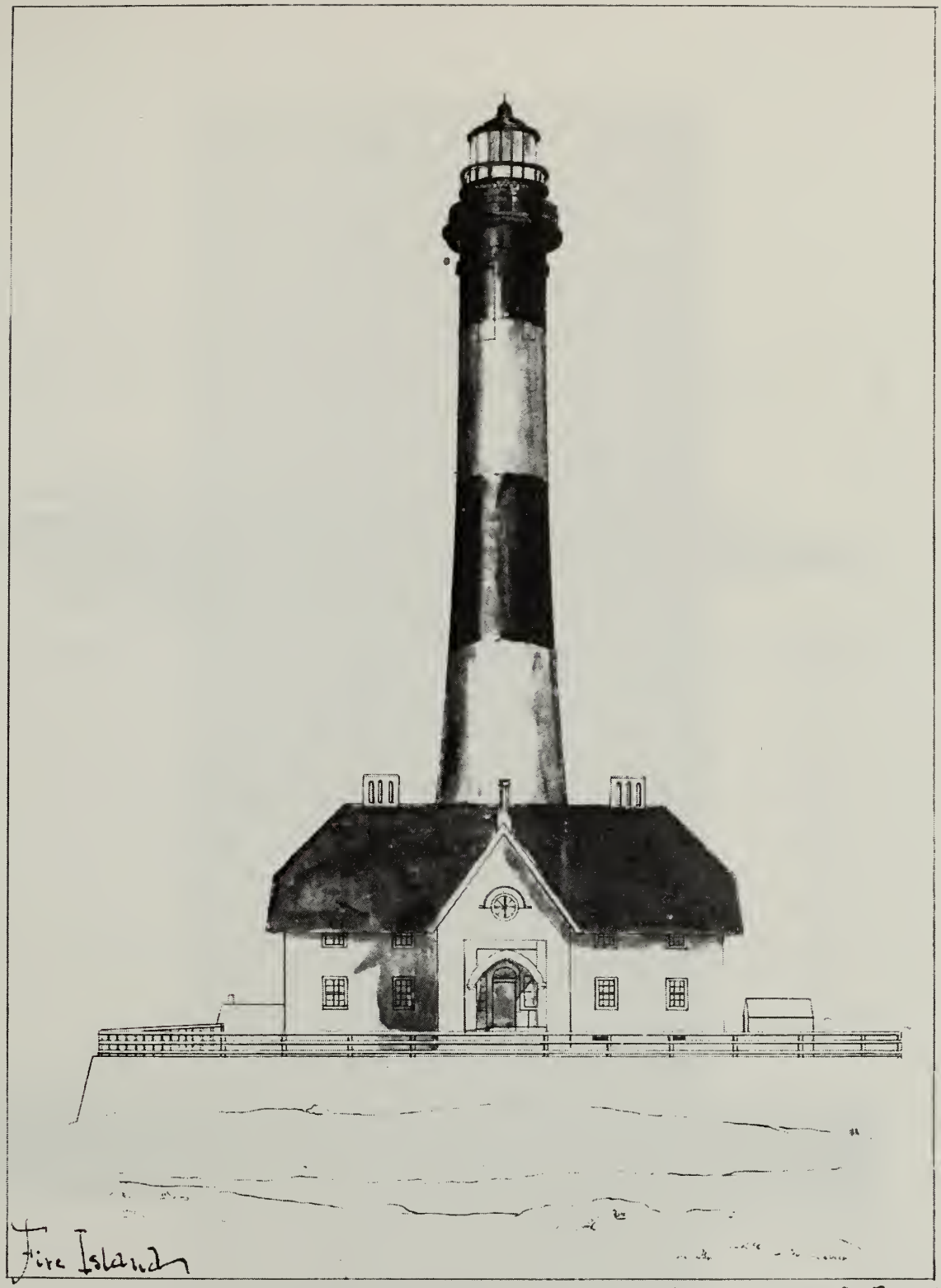


Figure 15. Map of Fire Island Light Station, showing location of lifesaving station, 1891, but based on 1873 survey.



Stat. Light-House Board.
February 16/1891

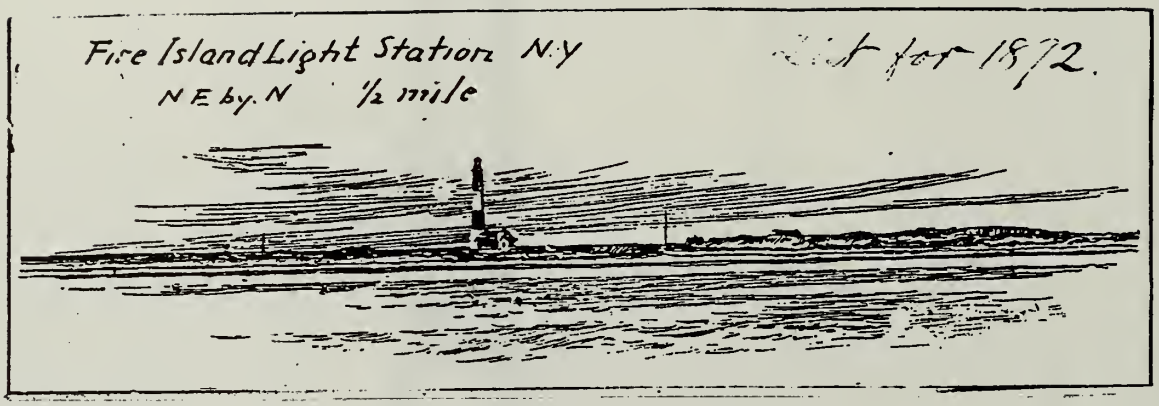
D. G. Greaves.
Major of Engineers U.S.A.
Engineer 3rd L.H. Dist.

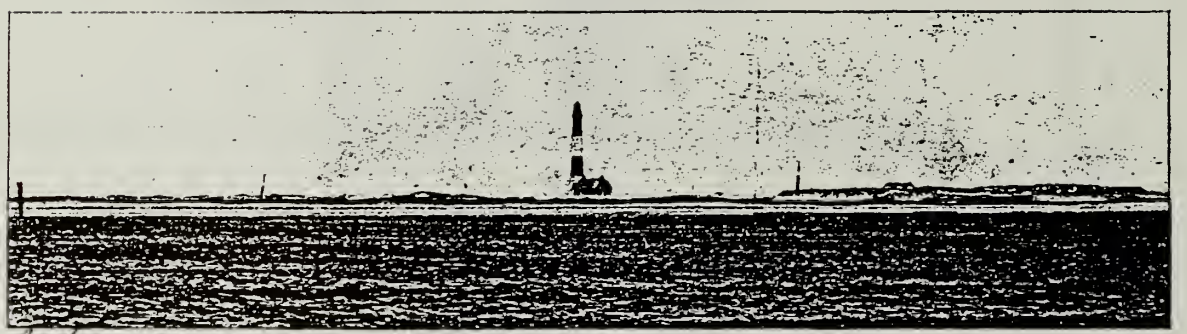
2F.

Accompanying Eng. Letter, Feby 16. 1891.
Filed March 7th 1891.

3-1F-16

Figure 16. Fire Island Lighthouse and Keeper's Dwelling: south elevation, February 16, 1891.





Light for 1895. FIRE ISLAND LIGHT-STATION, N. Y., NE. by N., ½ MILE. (See p. 58.)

Figure 17. Fire Island Light Station, ca. 1892 and 1895.



Figure 18. Fire Island Light Station (ca. 1895).



Figure 19. Fire Island Light Station: east elevations of the lighthouse and keeper's dwelling (1898).



Figure 20. Fire Island Lighthouse and Keeper's Dwelling: south and east elevations, August 12, 1900.



Figure 21. Fire Island Lighthouse and Keeper's Dwelling: east elevations (ca. 1899-1902).

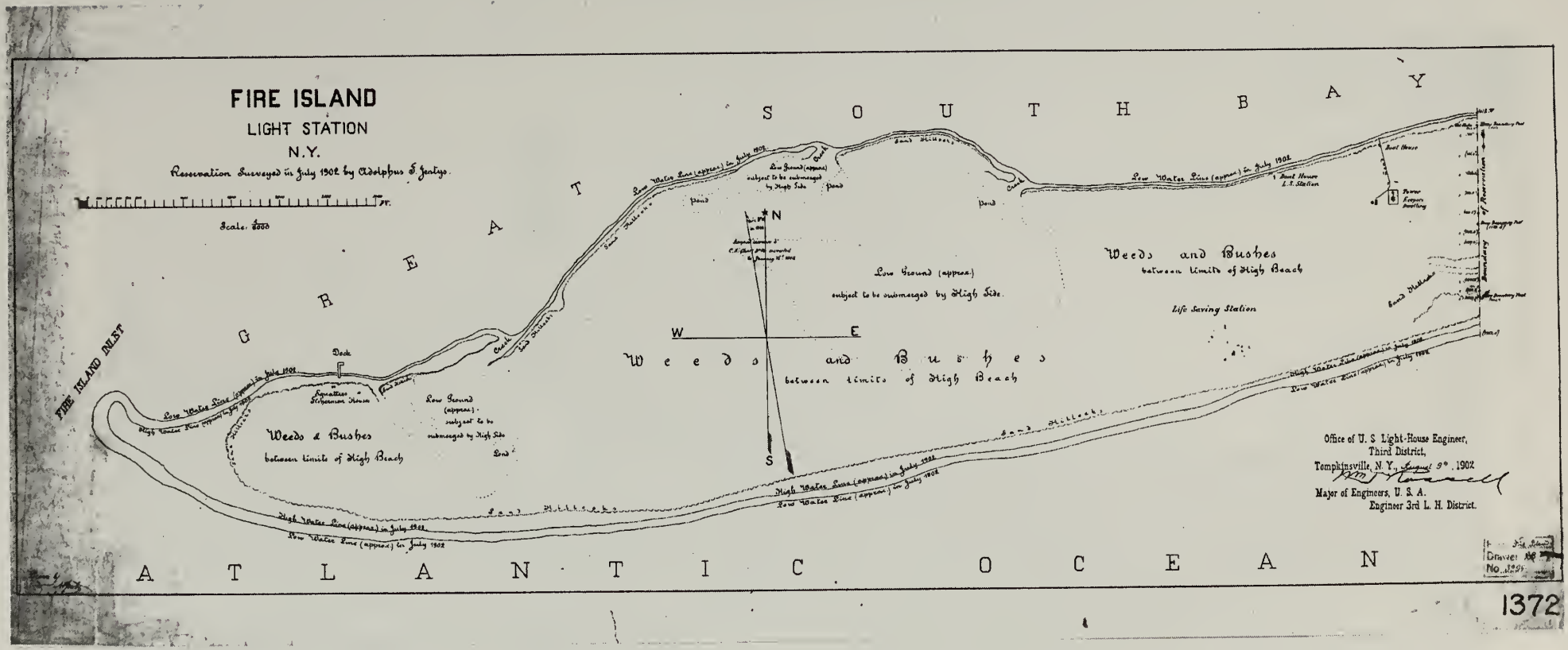


Figure 22. Map of Fire Island Beach: July 1902 survey, dated August 9, 1902.

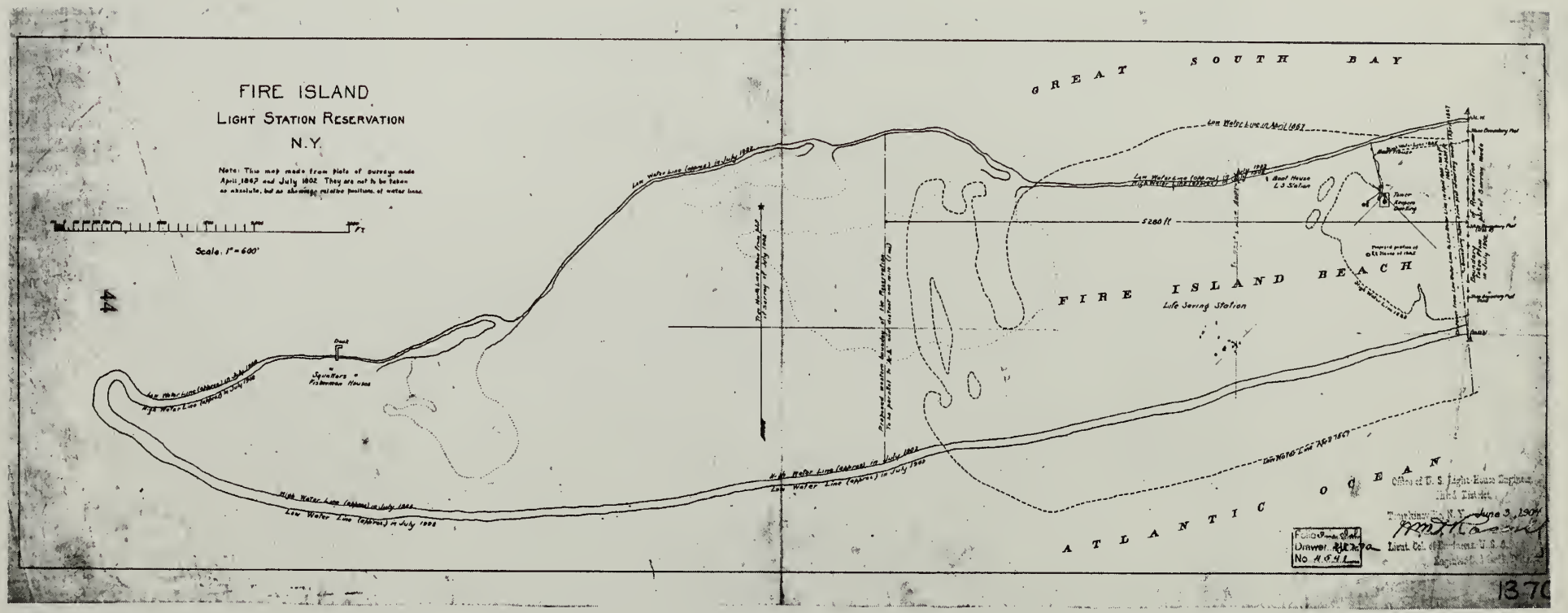


Figure 23. Map of Fire Island Beach (1904).



Figure 24. Fire Island Light Station: south and west elevations of the lighthouse and keeper's dwelling (ca. 1905).



Figure 25. Fire Island Lighthouse and Keeper's Dwelling: south and east elevations (ca. 1902-1911).

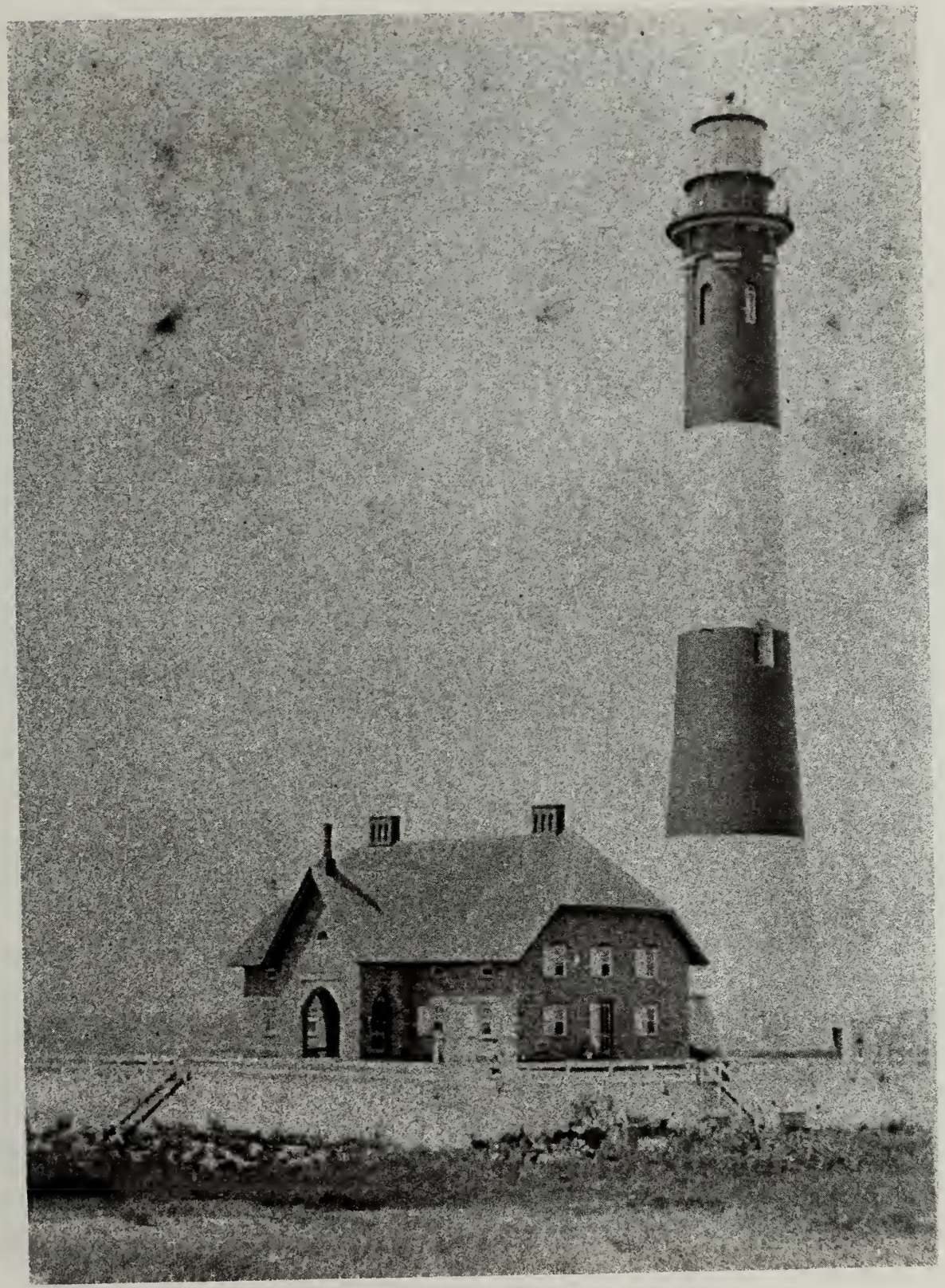


Figure 26. Fire Island Lighthouse and Keeper's Dwelling: south and east elevations, n.d.



Figure 27. Fire Island Lighthouse and Keeper's Dwelling: south and east elevations, ca. 1902-1911.

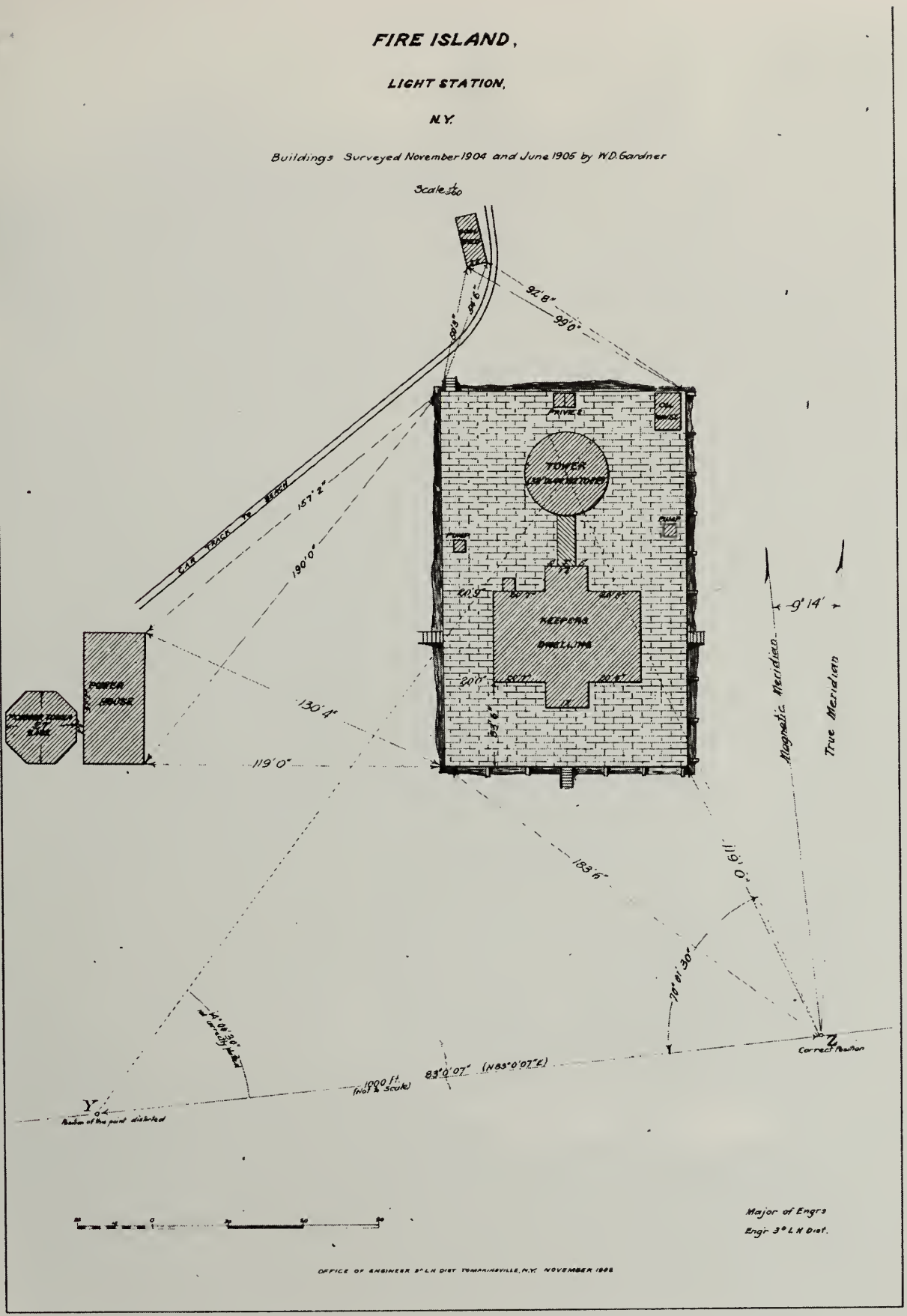


Figure 28. Plan of Fire Island Light Station: buildings surveyed November 1904 and June 1905, plan dated November 1908.



Figure 29. Fire Island Lighthouse and Keeper's Dwelling: north and east elevations, 1921.

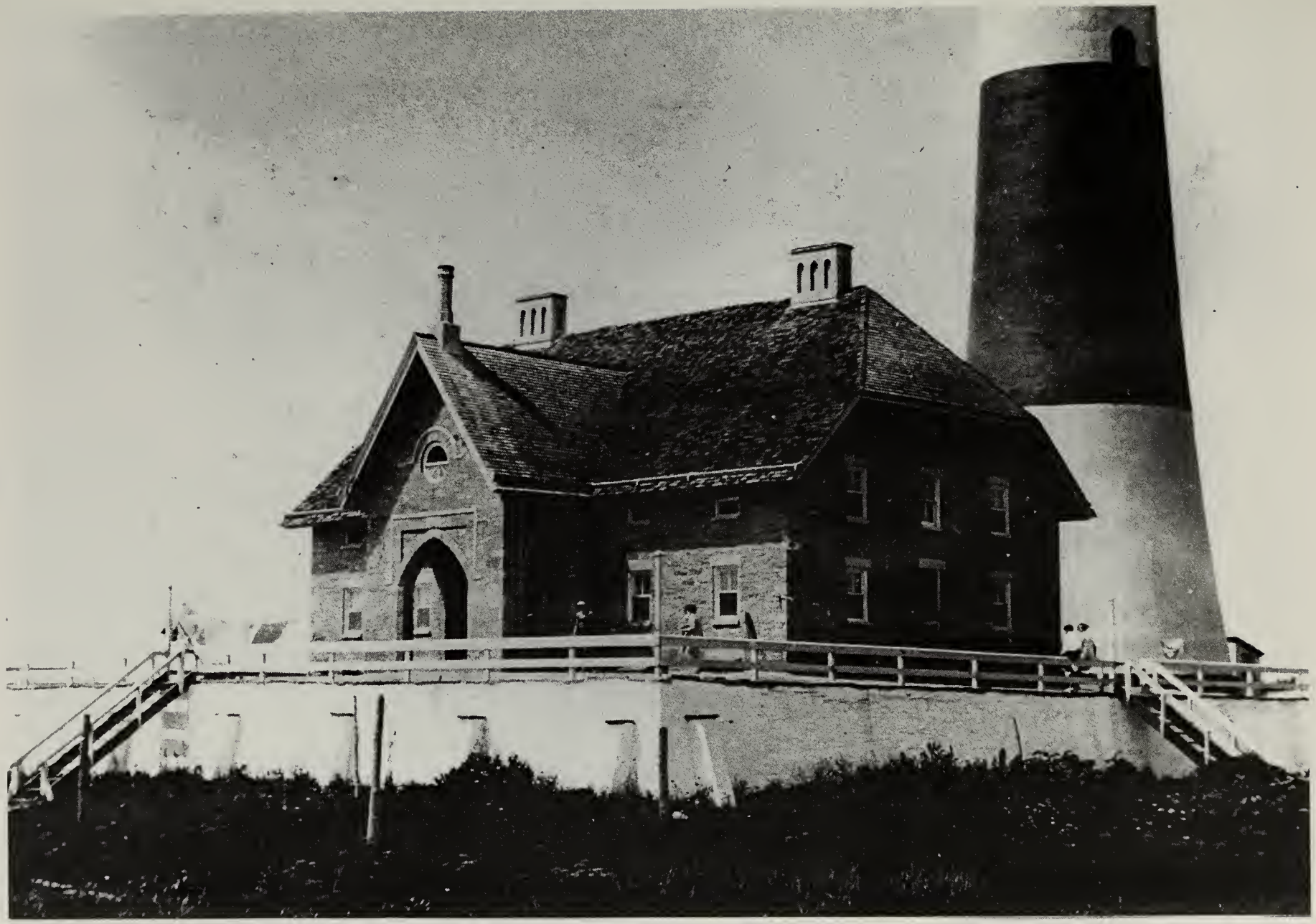


Figure 30. Fire Island Lighthouse and Keeper's Dwelling: south and east elevations (ca. 1920's-1932).



Figure 31. Fire Island Light Station, looking southeastward (ca. 1931-1938).



Figure 32. Fire Island Light Station: south and east elevations of the lighthouse and keeper's dwelling (ca. 1932-1938).

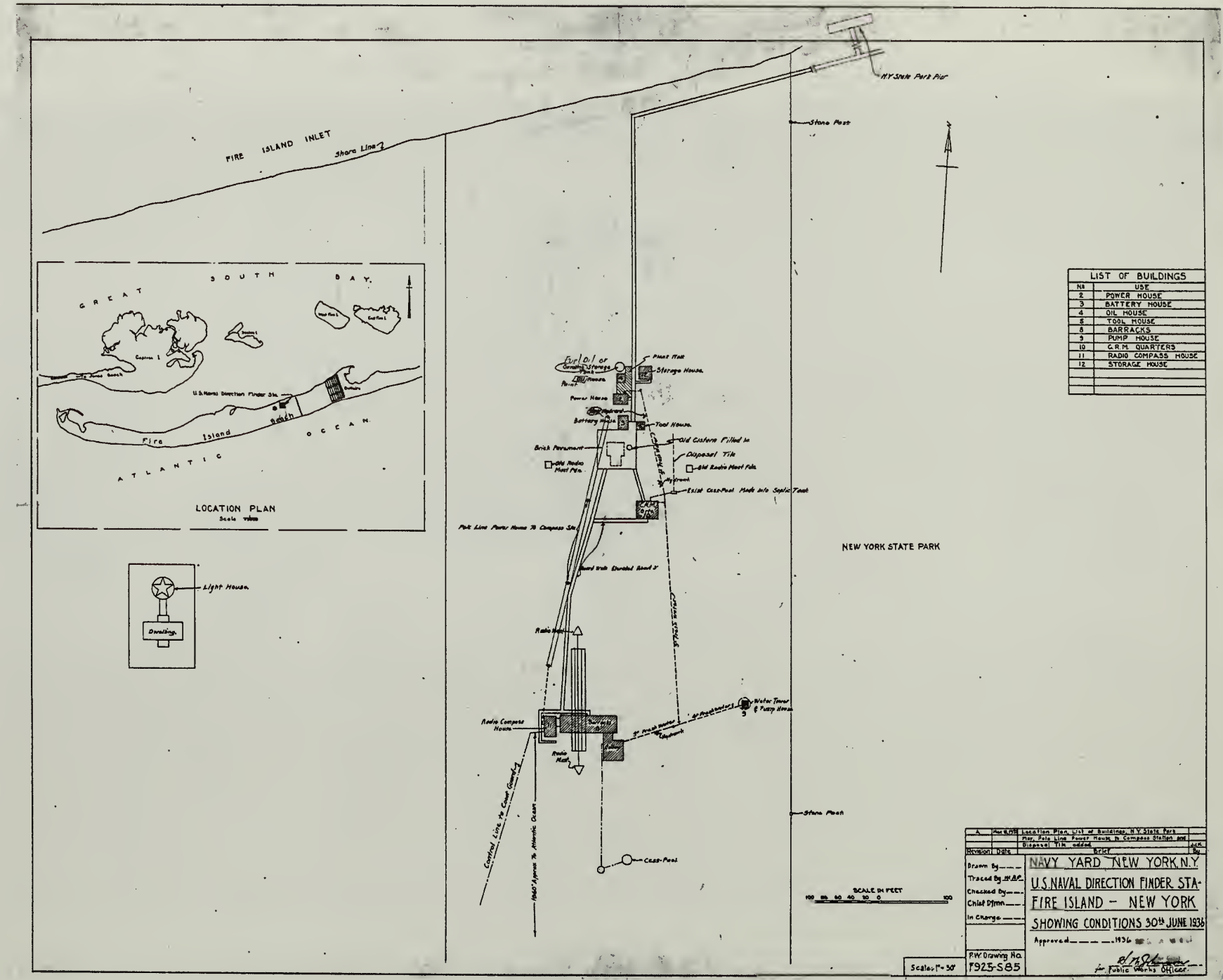


Figure 33. Plan of U.S. Naval Direction Finder Station at Fire Island, New York, showing conditions June 30, 1936.

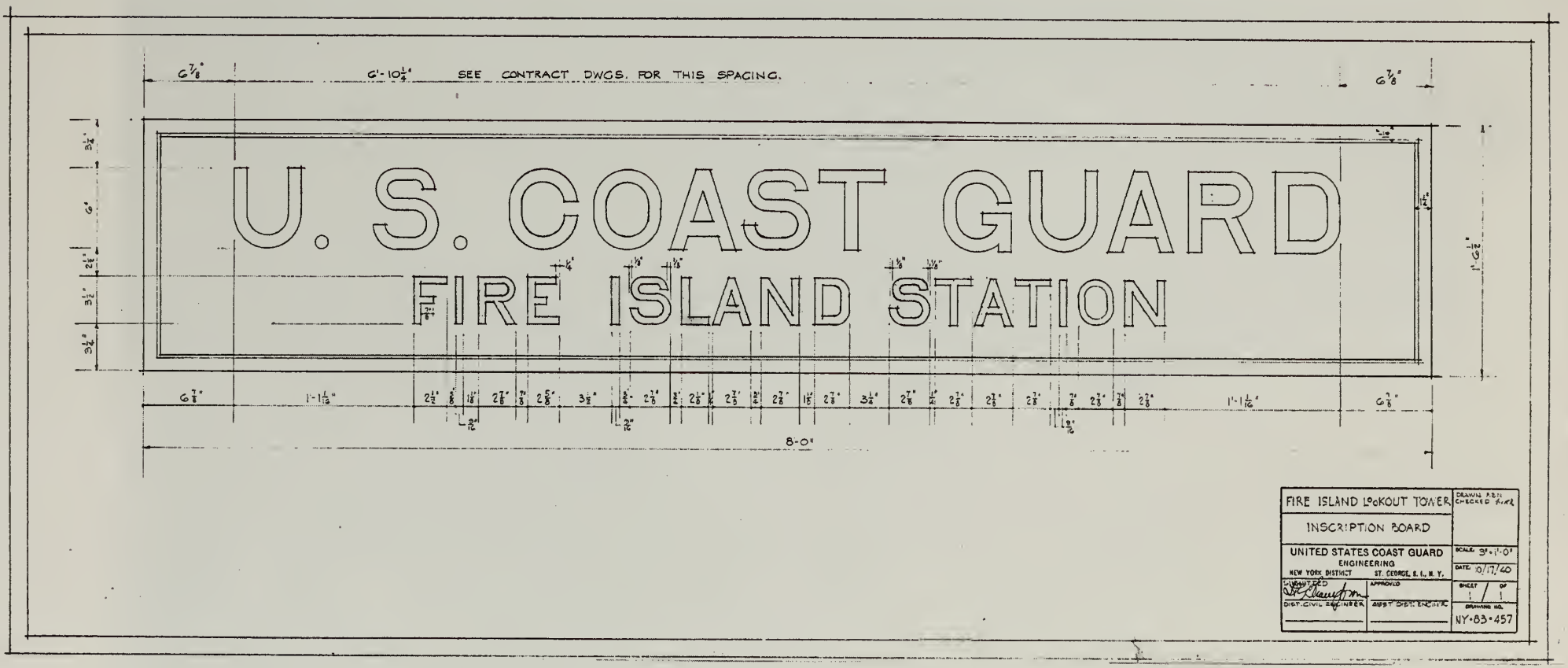


Figure 34. Fire Island lookout tower inscription board, October 17, 1940.



Figure 35. Fire Island Light Station, looking southeastward (ca. 1938-1945).



Figure 36. Fire Island Lighthouse and Keeper's Dwelling: west elevations (1945).



Figure 37. Fire Island Lighthouse and Keeper's Dwelling: south and east elevations (1945).

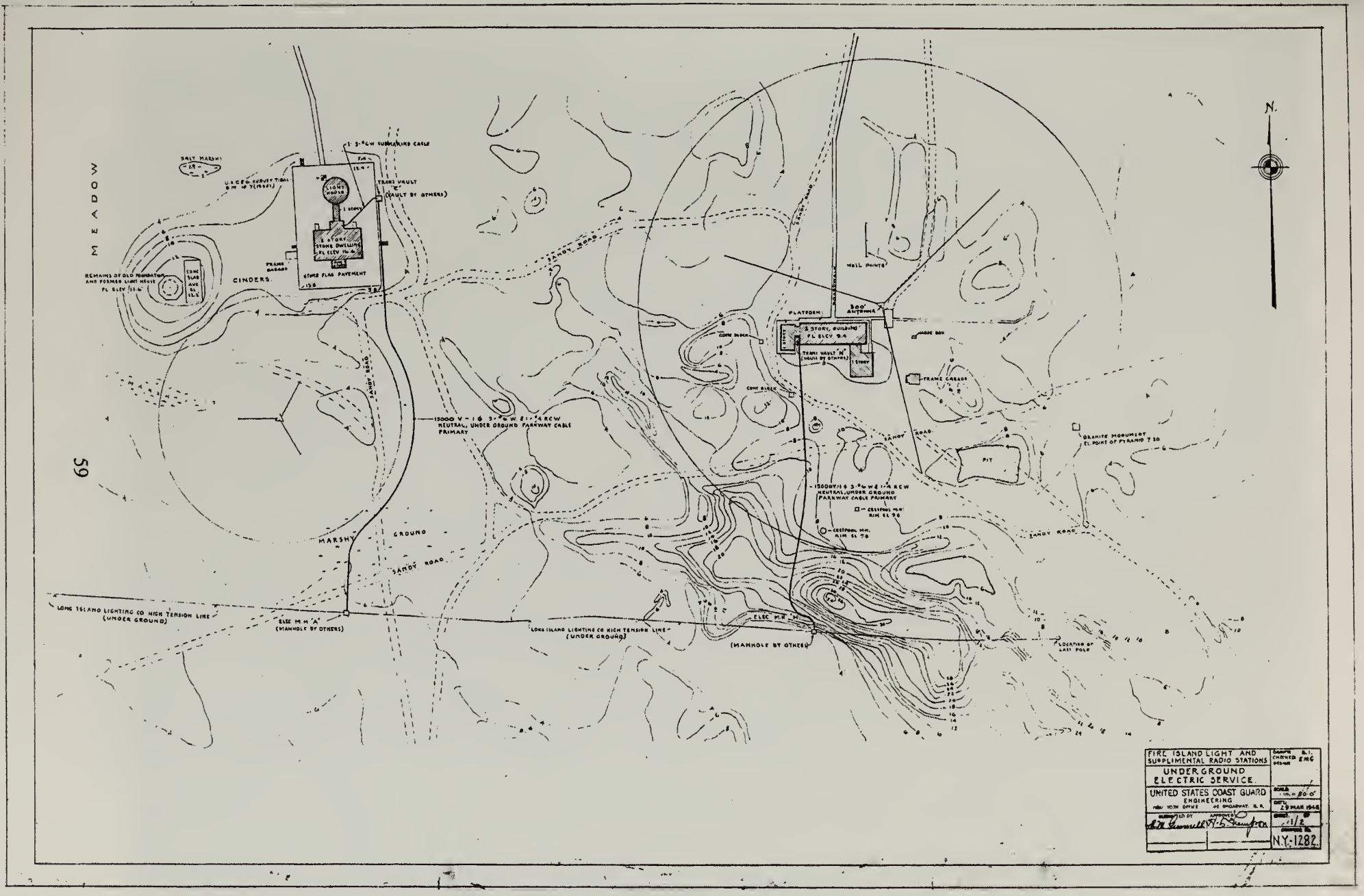


Figure 38. Map of Fire Island Light Station, showing underground electric service (1948).



Figure 39. Fire Island Light Station, looking northeastward (1956).



Figure 40. Fire Island Lighthouse and Keeper's Dwelling: south elevations (1956).



Figure 41. Fire Island Lighthouse and Keeper's Dwelling: east elevations (1956).



Figure 42. Fire Island Lighthouse and Keeper's Dwelling, looking southwestward (ca. 1960).



Figure 43. Fire Island Light Station, looking south-southwestward (1981).

CHAPTER 3.

THE TERRACE AND OUTBUILDINGS: ARCHITECTURAL HISTORY

INTRODUCTION

The 1858 Fire Island lighthouse and keeper's dwelling stand upon a raised terrace of stone and brick measuring 100 by 147 feet. This structure is called both a terrace and a pier in the historical documents. The keeper's dwelling is situated approximately 34 feet back from the south edge of the terrace; the lighthouse is centered behind the keeper's dwelling. The terrace is rectangular, being faced with stone embankment walls on the east, west, and north sides, and a brick embankment wall on the south The south embankment wall is finished with brick buttresses and stone capping. The terrace paving consists primarily of rectangular flagging stones; bricks are employed in a random pattern adjacent to the tower. Two stairways, one in front of the east entry and the other in front of the west entry of the dwelling, offer access to the terrace. A metal paint locker, or shed, is situated at the northwest corner of the terrace.

TERRACE

Original Construction

The Third District engineer, Lieutenant J. St. C. Morton, described the terrace of the second Fire Island lighthouse and keeper's dwelling in his construction completion report to the Lighthouse Board–dated September 30, 1858 (App. C-61)–as follows:

> There is a terrace around the entire premises which is embanked to a level of 13 feet above mean tide. This terrace is retained by a wall of dry stone masonry, the materials of which were obtained from the demolition of the old tower and Keeper's house.

This report indicates that the terrace was built of stone taken from two structures known to have been standing only one month previously (App. C-57). Either the terrace was constructed very rapidly, or the report was written in anticipation of completion of the work. As will be seen in Chapter 7, "Dwelling", the latter is more likely. In either case, the terrace apparently was built after the lighthouse was nearly finished.

A drawing of the east elevation of the structures (fig. 6), conjectured to be a construction drawing, provides the only visual documentation in National Park Service possession of the original concept for the terrace. This drawing features a stone embankment wall on the east and north elevations. On these elevations stone buttresses with stone caps are included. Nine buttresses support the embankment wall on the east elevation. The south-elevation embankment wall exhibits a brick face and brick buttresses; the brick face extends to the first buttress on the east elevation. The buttresses are capped with stone; the capping is sloped away from the wall.

The drawing illustrates stairways centered on the east, south, and north elevations of the terrace, rising from the ground to the terrace platform. There are 12 treads per stairway. A fence surrounds the perimeter of the terrace. The fence is composed of two rails. The east elevation includes five fence posts to the south of the stairway, and nine to the north.

These two pieces of historical documentation–the completion report and figure 6–suggest something of the actual, as-built appearance of the terrace. Several questions arise, however, when comparing the image created by the documentation with the appearance of the terrace today. These questions are:

- were the original embankment walls, indeed, laid as "dry stone masonry?"
- how extensively was the stone for the first lighthouse and keeper's dwelling reused in the new terrace?
- did buttresses surround the entire terrace, and of what materials were they constructed?
- did a fence encircle the perimeter, and were the stairways built as drawn?

Today, the embankment walls of the terrace are pointed with a lime mortar. This includes the brick south wall, whose brickwork extends around the corner onto the west wall, and the stone north, east, and west walls. The brick south wall is seen in a photograph dated ca. 1886 (fig. 11), and so is surely original. It would have been pointed from the time of its construction, owing to the nature of the material. The drawings and early photographs indicate that the three stone walls also date to 1857-1858. It is possible that they were originally "dry stone masonry," but conclusive evidence has not been uncovered thus far. Presumably, by removing the pointing mortar–or even lifting up several embankment-wall stones that have not been tampered with over the years–one could determine with some certainty whether the walls were laid dry.

The annual report for the year ending June 30, 1887 (App. C-85), describes the embankment walls of the terrace being pointed. This may represent the first pointing of the stone walls.

A determination of the quantity and location of the stone from the first complex reused in the second lighthouse complex has not been made. This could be accomplished, but it would require clearing brush overgrowth away from the terrace walls, and removing whitewash from the stones. Undoubtedly, the stone was reused. Salvage stone is discernible in the foundation of the keeper's dwelling.

Two of the earliest extant photographs of the structure (figs. 11-12, ca. 1886) do not show buttresses on either the south or west elevations of the terrace. Apparently, buttresses were not constructed as drawn in figure 6, and the buttresses extant today date to a later period of work.

The presumed construction drawing shows the terrace with a two-rail post and rail fence surrounding its perimeter. However, the monthly report for May 1873 (App. C-74) states that "a fence surmounting the pier is in the progress of erection." This is 15 years after the construction of the terrace. Was this the first perimeter fence to be installed, or a second one? The two-rail fence was probably the first fence: what appears to be the second fence is the three-rail post and rail fence seen in the ca.-1886 photographs (figs. 11-12).

Figure 6 also shows the terrace as having several stairways descending to the ground around the terrace. These are seen on the south, east, and north elevations, with the west elevation not being visible. They have handrails that appear to be extensions of the two-rail fence already discussed. However, figures 9, 11, 12, and 16 do not show such stairways or handrails.

Figures 11-12 show no opening in the south-elevation fence, and a small opening in the west-elevation fence, with what appears to be a single board step halfway between the levels of the terrace and the surrounding area. Figure 19 (1898) is the first to show a full stairway with fence-type handrails. It would thus seem that the original concept of full stairways, with handrails that were extensions of the perimeter fence, was not implemented until ca. 1886-1898.

Neither the drawing nor any other period document describes the original material employed for paving the platform of the terrace. Currently, the paving material is comprised of brick and flagging stones. The monthly report for April 1877 (App. C-74) describes the "brick and flagging" of the pier having undergone repairs. One would assume that these materials were original to the terrace.

The only outbuilding included in the construction drawing (fig. 6) is a privy. The privy is situated directly north of the lighthouse on the terrace; it has a shed roof and a four-light window with lintel and sill on its east elevation.

Repairs and Alterations

Platform

An 1868 survey (fig. 7) and its revised edition of February 20, 1888 (fig. 13), provide the following dimensions for the terrace:

south	96 feet
north	100 feet
east	147 feet
west	145 feet, 6 inches

Documentary records imply that the flagging stones and brick surrounding the lighthouse and keeper's dwelling were undergoing constant maintenance throughout the structure's history. The problems of settlement were paramount, presumably due to the fine beach sand that serves as the foundation for the paving.

The first record of repair is found in the annual report for the year ending September 30, 1865 (App. C-66). The report states that "the stone flagging around building were relaid in cement mortar." The monthly report for September 1876 (App. C-74) describes the flagging on the top of the pier as being in very bad condition, and as being subsequently repaired. The next two years follow with similar references: the monthly report for April 1877 (App. C-74) refers to the brick and flagging of the pier having undergone repair, and the monthly report for May 1878 (App. C-74) mentions that the pier flagging was pointed and repaired.

By the 1880's the paving had again begun to settle. The annual report for the year ending June 30, 1881 (App. C-85), makes reference to "the flagging having settled in places." The condition apparently was not remedied by June 1885, since the annual report for that year (App. C-85) comments that "the flagging and brickwork on the pier have sunk in places." In the ca.-1886 photograph (fig. 11) showing the south elevation, the wall capping stones are visible at the west half of the wall; at the east half, the capping stones are not as distinct.

A substantial amount of repair work was undertaken on the site in 1886 and 1887, as reported in the annual report for the year ending June 30, 1887 (App. C-85). The flagging of the pier was relaid. In 1888, as stated in the monthly report for July (App. C-85), the brick paving of the pier was relaid where necessary. This was only 30 years after the construction of the terrace.

The turn of the century saw the flagging of the pier relaid yet another time, as described in the monthly report for June 1901 (App. C-105). No later documentation has been uncovered regarding repairs to the terrace platform.

A visual analysis of the present flagging indicates that repointing has been performed at least twice in the 20th century. Two date markers have been left in the mortar: the first, etched in front of the west entry of the dwelling, is the year 1926; the second, inscribed on the south platform face of the south porch of the dwelling, is the year 1943. The various periods of repointing might be identifiable through mortar analysis, but the time constraints of this report prevented such a study.

Fence and Stairways

If the historical documentation is interpreted correctly, a fence was not constructed on the terrace until 1873 (App. C-74). The March 1880 Form No. 36 (App. C-86) describes the enclosure of the premises as follows: "a railing around the stone pier upon which the Building and Tower stand (100 x 150 feet)."

The annual report for the year ending June 30, 1881, notes that "the steps leading to the deck need renewal." The ca.-1886 photographs (figs. 11-12) feature a post and rail fence. The fence is composed of three board rails nailed to the outside of the posts. Only one access to the terrace is visible in the photographs, at the south end of the west elevation. An opening has been left in the fence, and a step platform that is separate from the terrace is extant. It is not clear whether this was a makeshift entrance or a designed entrance. Apparently other sets of steps also were extant then, because the monthly report for August 1888 (App. C-85) reports building one new set of steps and railing and repairing others. Also noted were repairs to the fence. The 1888 survey (fig. 13) displays a set of steps at each elevation: the stairways are located at the south, east, and west entrances, and at the west corner on the north elevation. The survey illustrates the west stairway with a shorter run than the others.

The February 16, 1891, sketch of the lighthouse and keeper's dwelling (fig. 16) includes a three-rail fence. No details are extant, however. This figure appears to have been based upon the ca.-1886 photograph of the south elevation (fig. 11).

A May 1896 report (App. C-94) describes the steps leading to the pier as being rebuilt. Figure 19, dating to 1898, includes a new two-rail fence and stairway accesses located at the south, east, and west entrances. These stairways and their handrails are designed integrally with the fence structure. This is the earliest figure showing a two-rail fence with integral stairways. The exact date of the new fence is not known, but it can safely be placed between 1886 and 1898. The work undertaken on the terrace between 1887 and 1888 seemed to be quite extensive, and that may have been when the second fence was constructed.

A photograph dating to August 12, 1900 (fig. 20), clearly includes the details of the two-rail fence and stairways. The rails are nailed to the outside of the posts. The upper rail has a board secured to its upper edge. This board protrudes beyond the rail's plane. The stairways are

constructed of two board stringers and 12 treads; the risers are open. A handrail contiguous with the fence lines each side of the stairways, being supported by four posts plus a newel post. A stairway was also installed on the north elevation, as documented in figure 21.

On November 13, 1900, work was authorized to rebuild the south embankment wall (App. C-105). A new fence was to be constructed on the repaired sections of the wall, and other areas of the fence were to be repaired. No other noticeable alteration in the fence or stairways can be detected in the 20th-century photographs until 1945. Figure 37, taken in 1945, does not include a stairway on the south embankment wall leading to the south entrance. When this stairway was removed is not known.

A more recent wooden post and rail fence has been constructed around the southern half of the terrace. The exact date of its construction is not known. A chain-link fence surrounds the northern half of the terrace. This fence was installed by the U.S. Coast Guard in 1968 to guard against vandalism (App. C-155).

A Coast Guard report of site conditions, dated October 21, 1975 (App. C-156), describes the following fence work to be performed:

- damaged barbed wire atop the perimeter fencing is to be replaced;
- Coast Guard locks will be installed on the fencing; and
- access-deterring signs will be placed on the fencing.

The postholes for the former wooden fence around the terrace perimeter remain in the capping stones of the embankment walls. Several periods of mortar appear to survive in the holes. It may be possible from this physical evidence–combining archeology and mortar analysis–to reconstruct the various types of fencing.

Embankment Walls

The south embankment wall appears to have always been of brick, while the east, west, and north walls have always been stone. A monthly report dating to May 1873 (App. C-74) is the earliest record in National Park Service possession of repairs to the pier. The reference is vague, and whether the embankment walls were included in the work cannot be discerned.

The ca.-1886 photographs (figs. 11-12) show a stone wall on the west elevation, without buttresses. The south wall is of brick, with the brick extending around the corner to the west elevation. The brick meets the stone in a step-pyramid shape flush with the wall. No buttresses are extant on the south wall. The upper end of the south embankment wall, to the west of the center, is capped with flagstone; the east half is not clearly visible. The jointing of the masonry is not discernible in the photographs. Whether the stone walls are laid dry at this point in the structure's history cannot be determined.

The annual report for the year ending June 30, 1887 (App. C-85), states that the embankment walls had been pointed during the year. This may have been the first pointing of the stone walls. Ten years later, the annual report for the year ending June 30, 1897 (App. C-94), describes the "sides of the pier" being pointed again.

The August 12, 1900, photograph (fig. 20) offers a clear image of the embankment walls. The figure includes only the south and east elevations, however. Buttresses are extant on both walls. The south embankment wall is deteriorated; large cracks are visible, particularly in the area between the southeast corner and the first adjacent buttress. The four brick buttresses that are illustrated appear taller and narrower than the extant buttresses. They feature stone caps. The buttresses are in various stages of deterioration; the third buttress from the southeast corner no longer has its stone cap. The east embankment wall has only one buttress at its southeast corner; no others are extant. The whitewash finish is intact, although some staining is visible on the wall. A pipe emerges from the wall at the north end of the east wall. Plant growth appears to have infiltrated the joints on both sides of the terrace.

In 1901 the deteriorated embankment wall received some attention. The monthly report for June 1901 (App. C-105), states "damaged brick wall on south side of foundation removed and replaced with a new 12" brick wall 54" in length; portion of same on east side repaired and partly replaced with new brick wall." The annual report for the year ending June 30, 1901 (App. C-105), summed up the repairs as the "pier rebuilt on two sides." However, the work apparently also included the rebuilding of the portion of south-wall brickwork that extended onto the west wall. Figure 12 (ca. 1886) shows the west-wall brickwork as meeting the west-wall stone in a diagonal line, whereas the current brick-stone junction is a vertical one. The annual report for the year ending June 30, 1906 (App. C-105), makes reference to repairing the retaining wall of the lighthouse pier.

Figures 27 and 30 show the south and east elevations of the embankment wall after the 1901-1906 repairs. The south wall exhibits one more buttress (eight rather than seven). The buttresses appear to be shorter, as well. The south stairway is not positioned over a buttress any longer. The east-elevation buttress has been repositioned further away from the southeast corner. The walls all have been freshly whitewashed. No other 20th-century documentary data regarding the embankment walls was uncovered during the research for this report.

OUTBUILDINGS

The history of outbuildings presented below is merely a survey, not an all-inclusive study. The focus is on the structures that were directly related to the lighthouse and keeper's dwelling, appearing in the historic figures and documentary material. The narrative is organized chronologically, and is followed by a chart that identifies the outbuildings seen in the figures.

The drawing conjectured to date from 1857-1858 (fig. 6) shows one small, unidentified, shed-roofed building on the terrace, north of the tower. The April 1868 plan of the Fire Island Light Station (fig. 7) shows this building from the top; indicates that it measured 5 by 8 feet but still does not identify it. A similar survey dated February 20, 1888 (fig. 13), reveals that it was the privy. The 1888 survey is based upon the 1868 survey, but is an updated version. It shows not only the privy, but also two wells, to the northeast: and northwest of the dwelling. Although the two wells do not appear on the April 1868 survey, at least one and perhaps both were extant then: documentary data from 1862 mentions an estimate submitted for repairing a pump (App. C-56). The annual report for the year ending September 30, 1869, makes reference to a new well pump having been furnished. The pumps were a constant item of repair and replacement, as the annual and monthly reports attest. (See page 76 for a record of the repairs to the pumps.)

In 1877, a plank walk 675 feet long was laid from the beach to the lighthouse (App. C-74). By 1884, the plank walk from the station to the boat landing was renewed and extended (App. C-74).

Figure 11 includes two buildings: one to the northwest of the terrace, not on it, and one to the east of the tower, on the terrace. The northwest building lies on an east/west axis, and has a wood-shingled gable roof with a chimney at its west end. A doorway and window are visible on the south elevation. The east building is also on an east/west axis, with a gable roof. Its siding appears to be painted a light color, possibly white.

Both of these buildings were standing in 1886 (fig. 11), and the northwest one is seen as early as 1874 (fig. 9). Neither one, however, appears on the 1888 site survey (fig. 13). The northwest building could have been omitted because of its location off the terrace, but the east building should have been included. Both may have been left off the survey because of their lack of importance: there is no record of their usage. Either may have been used as a coal house until a building was erected especially for that purpose in 1888, as described subsequently.

The year 1888 saw the construction of a boat house 14 by 30 feet, with a shingled roof and batten sides; a boat cradle 16 by 5 feet; and a boat way 120 feet long (App. C-85). A coal house was constructed, as well as an oil house.

A sketch made in 1891 (fig. 16) shows both outbuildings mentioned previously, but it may have been made from figure 11, and not from life. Appendix C-94 reveals that the plank walk was repaired in 1891, but a new plank walk to the boathouse was needed. The same document indicates that the boat ways were repaired and lengthened in 1893.

The greatest activity at the station during the 1890's seems to have been related to the construction of the electric powerhouse in 1894 (App. C-94). A 750-foot narrow-gauge track was laid from the shore to the site of the building. The powerhouse was constructed within the year, including a cistern with a 10,500-gallon capacity. It had an arched roof and monitor-type skylight. In 1896, however, the entire electric plant was removed to the Third Lighthouse District depot, never to have fulfilled its function. The powerhouse structure remained.

A flagpole for hurricane signals was erected in 1895 (App. C-94). In 1897, 50 shingles for the roof of the privy were furnished, and the roof was repaired (App. C-94).

Figure 19, dating to 1898, includes the abandoned powerhouse structure. Two windows and a doorway are visible on its east elevation. The 1895 flagpole is seen in front of the wooden observation tower. The 1888 oil house rests on the terrace at the northeast corner; its axis is north/south, with a doorway on the south elevation. The roof is gabled. Several other structures of unknown function are included in the photograph.

The south wall of the oil house is visible in figure 20 (1900). The door appears to be a board-and-batten type, and is dark-colored on its north side. The structure itself is light in color, possibly white. The roof of the shed is metal. A smaller shed, facing west, is situated in front of the south embankment wall, east of the stairway.

A date has not been ascribed to figure 21. This photograph is thought to have been taken around 1900, based on the presence of 1899 shutters and the pre-1902 lower balcony railing. The oil house and privy are depicted in this view; the privy's east-wall window is seen. Figure 21 does not show the shed to the south of the terrace, which is seen in figure 20 and in subsequent similar views.

It appears that the angle from which figure 21 was taken caused the shed to be hidden by the wall of the terrace. Two new "No.-2" well pumps with platforms and covers were furnished and fitted in 1902.

Figure 24 dates to ca. 1905, offering a clear view of the south and west elevations of the powerhouse. The cistern is extant, as well. The shed in front of the south embankment wall and the privy are shown. On the terrace west of the lighthouse is a shed of unknown function.

A survey of the lighthouse reservation was extended and completed by 1905 (fig. 28). This survey included the following: privies, oil house, two pumps, coal shed, powerhouse, and rail track.

A 1921 view of the northeast side of the lighthouse (fig. 29) provides a glimpse of the privy, the oil house, and the corner of the terrace shed situated west of the lighthouse. The oil house was demolished by fire in 1929. Whether the oil house on the terrace is the structure that was demolished is not clear.

Figure 31, which dates to ca. 1932-1938, includes a view of the boathouse and the north elevation of the powerhouse structure. The shed west of the lighthouse, on the terrace, is visible. Presumably the privy was removed with the installation of interior bathrooms in the keeper's dwelling ca. 1932. In 1939, a well was driven 200 feet, and an electric pump was installed (App. C-150).

Figure 35, taken between 1938 and 1945, indicates that by then the boathouse had been painted a light color, possibly white. The photograph also shows, for the first time, a one-story building off the terrace, between the dwelling and the powerhouse structure. The building also appears in a photograph of the west elevation of the lighthouse and keeper's dwelling dating to 1945 (fig. 36). It may well be the "frame garage" noted in figure 38, dated May 29, 1948. This figure is a survey of the underground electrical service. It also shows a "transformer vault" building, off the terrace to the east of the lighthouse, apparently abutting the east embankment wall. It probably was installed as part of the electrical system introduced in 1939.

By 1956, the powerhouse structure was no longer extant (figs. 39-41). The boathouse was still intact. A metal, one-story paint locker, or shed, was installed at the northeast corner of the terrace, in the former location of the oil house. (Charred areas on the terrace recall the latter's destruction by fire in 1929.) A one-story masonry structure appears on the east side of the structure north of the stairway. This is the transformer vault building constructed ca. 1939.

Figure 42, dating to ca. 1960, shows the boathouse missing from the shore of the Great South Bay. A wooden structure has been moved onto the foundation of the former powerhouse. This wooden structure resembles the former boathouse in design, and may indeed be the boathouse. Further research is needed to confirm this hypothesis.

Three outbuildings in the immediate vicinity of the lighthouse have survived into the 1980's: the paint locker, the transformer vault building, and the wooden structure on the foundation of the powerhouse.

OUTBUILDINGS SURVEY (Based on Historic Figures)			
Figure no.	**Date**	**Outbuilding**	
		no.	**name**
6	1857-1858	#1	privy (original)
9	1874	#2	wood-roofed structure off NW corner of terrace; east-west axis (date? coal shed?)
11	ca. 1886	#2	wood-roofed structure off NW corner of terrace; east-west axis
		#3	shed on NE corner of terrace; east-west axis (date?)
16	1891	#2	wood-roofed structure off NW corner of terrace; east-west axis
		#3	shed on NE corner of terrace
19	1898	#1	privy
		#4	oil house on NE corner of terrace; north-south axis (1888)
		#5	powerhouse off terrace to west (1894)
		#6	gable-roofed one-story structure west of powerhouse (date?)
		#7	shed off terrace to east (date?)
		#8	observation tower (date?)
		#9	hurricane signal flagpole (1895)
20	August 12, 1900	#1	privy
		#4	oil house
		#10	shed off terrace to south (date?)
21	n.d.	#1	privy
		#4	oil house
24	ca. 1905	#1	privy
		#5	powerhouse
		#10	shed off terrace to south
		#11	cistern west of powerhouse (1894)
		#12	shed on terrace west of lighthouse (date?)
25	ca. 1902-1911	#1	privy
		#4	oil house
		#5	powerhouse
27	ca. 1902-1911	1#	privy
		#4	oil house
		#13	boathouse (1888)
29	1921	#1	privy
		#4	oil house
		#12	shed on terrace west of lighthouse
30	ca. 1920's-1932	#1	privy
		#4	oil house
31	ca. 1932-1938	#5	powerhouse
		#11	cistern
		#12	shed on terrace west of lighthouse
		#13	boathouse
32	ca. 1932-1938	#1	privy
		#4	oil house
		#5	powerhouse
		#13	boathouse
35	early 1940's	#5	powerhouse
		#11	cistern
		#13	boathouse
		#14	1-story bldg. off terrace, between dwelling and powerhouse (garage?)
39	1945	#14	1-story structure off terrace, between dwelling and powerhouse
39	Aug. 22, 1956	#13	boat house
40	Aug. 22, 1956	#15	transformer vault: east of terrace (ca. 1939)
41	Aug. 22, 1956	#16	paint locker in place of oil house (ca. 1950)
42	ca. 1960	#15	transformer vault: east of terrace
		#16	paint locker
		#17	1-story wood structure built on foundation of powerhouse (the moved boat house?)

CHRONOLOGICAL LIST OF REPAIRS AND ALTERATIONS TO THE TERRACE AND OUTBUILDINGS, 1862-1939

(Compiled from Historical Documents)

1860's

1862
- estimate submitted for repairing pump

1865
- stone flagging around the buildings relaid in cement mortar

1869
- new well pump furnished

1870's

1871
- new well pump provided

1873
- terrace or foundation of tower repaired
- fence constructed around terrace
- small repairs made to pump platform, and new pump furnished
- noted that cisterns required cleaning and pumps needed to be put in proper order

1874
- new pump and platform erected

1876
- brick and flagging of pier repaired and repainted

1877
- plank walk 675 feet long laid from beach to lighthouse
- "Pickering" pump &c repaired and refitted

1878
- terrace flagging pointed and repaired

1880's

1881
- noted that flagging settled in places
- noted that pumps were entirely worn out
- noted that steps leading to deck required renewal

1882
- two new pumps furnished

1884
- plank walk from station to boat landing renewed and extended

1885
- noted that flagging and brickwork on the terrace had sunk
- noted that pump of cistern worn out
- pump furnished

1887
- terrace flagging relaid
- embankment walls of terrace pointed
- noted that pumps for east cistern were required

1888
- brick paving of terrace relaid where necessary
- one new set of steps and railing built, and others repaired
- fence repaired
- three boundary posts set
- boat house 14 by 30 feet built with shingle roof and batten sides
- boat cradle 16 by 5 feet built; boat house fitted with winch
- boat way 120 feet long built
- coal house built
- oil house completed

1890's

1890
- noted that pumps required repairs

1891
- noted that new plank walk to boat house required
- plank walk repaired

1893
- boat ways repaired and lengthened

1894
- noted that material for railroad delivered; 750 feet of narrow-gauge track constructed from shore to site of powerhouse
- noted that material for "electric building" had landed – cement for foundations and floors; frame of buildings, except sills and plates; corrugated iron for covering same, and necessary rigging
- foundation for the powerhouse completed; frame set up and boarded to eaves; concrete floor in portion to be occupied as coal bin completed
- powerhouse walls filled with sawdust mortar; two boilers, one engine, and one dynamo set in place and pipe connection made
- retaining wall built north of the powerhouse
- keeper's coal shed moved
- powerhouse completed and painted
- cisterns of 10,500-gallon capacity built

1895
- portable boat ways built, and three lengths delivered to station
- flagpoles for hurricane signals erected

1896
- pump braces and valves repaired
- entire steam and electric plant removed to depot
- terrace steps rebuilt

1897
- one barrel of cement for pointing terrace furnished, and terrace pointed
- 50 shingles for roof of privy furnished, and roof repaired

1899
- authority to use a building, and to erect a pole for experiments in wireless telegraphy, granted to War Department Signal Office

1900's

1901
- damaged brick wall on south side of foundation removed and replaced with a new 12-inch thick brick wall 54 inches long; portion of same on east side repaired and partly replaced with new brick wall
- flagging on terrace relaid
- new fence built on repaired parts of wall, and other areas of fence repaired
- pumps and frames of wells repaired
- brick wall damaged by lightning July 3, 1901, and repaired

1902
- two new "No. 2" well pumps with platforms and covers furnished and fitted
- oil house patched

1905
- survey of the lighthouse reservation extended and completed

1910's

1911
- plank walk, railway tract repaired
- new doors for outhouses installed
- outhouses repaired

1920's

1929
- oil house demolished by fire

1930's

1939
- well driven 200 feet, and electric pump installed

CHAPTER 4.

THE TERRACE AND OUTBUILDINGS: CURRENT APPEARANCE AND CONDITION

TERRACE

Platform

Description

Material The primary paving material for the terrace consists of blue-gray flagstone (fig. 44) pointed with at least three different periods of mortar. Brick paving of at least two periods is extant to the north and west of the lighthouse tower. Concrete slabs are associated with existing and former outbuildings.

Dimensions Stones are of random size, some as long as 45 inches and as wide as 29 inches.

Design The random-sized stones–which rest on beach sand–surround the dwelling and partially encircle the lighthouse. In front of the dwelling, the stones are laid in a north/south pattern; to the side of the dwelling, the pattern runs east/west. Various mortars are extant: one features shell aggregate; another is brown concrete with black and white aggregate. Etched in the concrete mortar in front of the west doorway to the west apartment is the date "1926." This mortar is light in color, containing a white aggregate.

Brick paving is extant to the west and north of the lighthouse tower. These bricks run east/west. Modern brick repairs have been made, with bricks marked "S & F" on their surfaces.

Three concrete slabs are present on the terrace: one at the former privy location (fig. 45); another at the former covered passageway location; and one acting as the foundation of the paint locker (fig. 46).

A wooden well-pump cover (fig. 47) is located at the northwest corner of the keeper's dwelling.

Condition The perimeter of the platform throughout the entire area slopes upward toward the outside embankment walls. The capping stones for the walls are higher, as the interior portion of the platform has settled. Mortar is deteriorated and stones are missing or cracked randomly. At the northwest corner of the house the platform dips, establishing another valley. The stone around the lighthouse is badly displaced and large areas are missing.

Fences and Stairways

Description

Material Fence surrounding the keeper's dwelling, and its stairways, are of wood; fence around the lighthouse is of chain link.

Dimensions Wooden fence – approximately 3 feet high
Cyclone chain link – 6 feet high, 300 feet long
Posts of earlier fence – 3 ½ inches square

Design A modern wooden fence featuring three rails runs along the perimeter of the southern half of the terrace (fig. 48). The two lower rails are wide plank boards nailed to the outer sides of the posts; the upper railing board is set at an angle, sloping towards the terrace. The posts feature a square center member sandwiched between two narrower planks. The narrower planks rise above the center members to provide nailers for the upper slanted boards. An earlier wooden fence ran around the entire perimeter of the terrace. The holes for the posts of this fence are still visible in the capping stones of the embankment walls at the northern half of the terrace, where there is no wooden fence today. The postholes in the capping stones of the embankment walls at the southern half of the terrace were reused for the posts of the modern fence. Two different types of mortar are evident in the empty postholes, and a third type–a concrete–appears to be holding the current fence posts in the reused holes.

Stairways are extant on only two sides of the terrace, directly in line with the side entrance to the keeper's dwelling. The stairways date to the same period as the current fencing. The stairways consist of eight steps, open risers, and wooden plank treads. The railing is of 2 by 4 stock.

The northern half of the terrace–containing the lighthouse tower–has a modern chain-link fence around its perimeter (fig. 49). This fence runs to the wooden fence around the southern half, and then turns toward the center of the terrace, intersecting the north corners of the dwelling's north vestibule (fig. 50). This fence was installed by the U.S. Coast Guard to minimize vandalism. It is of unpainted galvanized metal. Of typical chain-link design, the fence features round posts topped with extension bars and barbed wire. There is a gate in the northwest corner of the north side, and in the southeast corner on the south side.

A flagpole is extant in the center of the south side of the fence. Light posts are located at each corner, and by each entrance. Sound speakers remain from the Coast Guard period at the southwest and southeast corners of the fence.

Embankment Walls

South Wall

Material Brick

Dimensions Brick size 7 ½ inches long by 3 ½ inches wide by 2 ¼ high

Design The brick wall (fig. 51) is laid in American common bond, with every fifth course being a header. The wall is finished with eight brick buttresses (fig. 52). These buttresses are laid in stretcher bond. The wall and the buttresses are capped with flagstone. The buttresses are thicker at their bottoms than at their tops.

Finish Whitewash

Condition The brickwork west of the center point, for approximately 12 courses up, is spalled badly in some areas; mortar is also missing. The upper three courses feature some cracking. The stone wall capping is loose, and the stone caps on the buttresses are without bond in some cases. The fourth buttress cap from the east is partially gone. A severe vertical crack has formed in the southeast corner of the wall. From the center point west, the wall is missing much of its whitewash; to the east, the finish is in fair condition. The stairway is no longer extant in the center, and a vertical crack in the wall exists in that location.

North Wall

Material Stone, random-cut rubble

Design The west end of this wall is mostly obscured by a dune. The top of the wall is capped with flagstone.

Finish Whitewash

Condition Heavy overgrowth is present. The upper capping stones are badly deteriorated, and the mortar is missing.

East Wall

Material Mostly stone, some brick. Stone is rough-cut rubble of random dimensions. Brick carries over 9 to 9½ feet from south embankment wall; a brick buttress exists in the southeast corner.

Design The east embankment wall (fig. 53) is constructed of stone rubble, with one brick buttress remaining at the southeast corner. This brick buttress has a stone cap, and is similar in design to those on the south embankment wall. The northeast corner of the wall was rebuilt at some point, as evidenced by the different type of stone used here. The platform's flagstones, which also serve as capping stones for the wall, protrude slightly out from the wall's plane.

Finish Whitewash everywhere, except on the capping stones

Condition Several capping stones are missing to the north of the stairway. There are cracks and missing mortar throughout. The wall approximately 15 feet north of the stairway is covered with heavy root overgrowth and green mold. The wall south of the stairway is bulging out to a small degree. The brick shows evidence of black paint. At the northeast corner of the wall is a large vertical crack.

West Wall

Materials Mostly stone, some brick. Stone is rubble of random dimensions. Brick carries over from south embankment wall approximately 43 inches; brick buttresses are located at southwest corner of wall. Walls and buttresses are capped with flagstone.

Dimensions Bricks measure 7 ½ inches long by 3 ½ inches wide by 2 ¼ inches high. Height of wall varies according to terrain; stone is visible for approximately 62 inches. Brick facing on side extends approximately 43 inches.

Design The west embankment wall is constructed of stone rubble, with three brick buttresses in various stages of repair. These buttresses are to the south of the stairway. The one closest to the stairway has only five intact courses. The center and the southwest-corner buttresses are completely intact, but the center is covered with brush. The buttresses are of similar design to those of the south embankment walls. There are no buttresses to the north of the stairway.

Finish Whitewash

Condition Mortar is missing and deteriorated throughout. The wall area to the north of the stairway is badly overgrown with vines all the way to the beginning of the chain-link fence around the lighthouse. The wall is not visible behind the overgrowth.

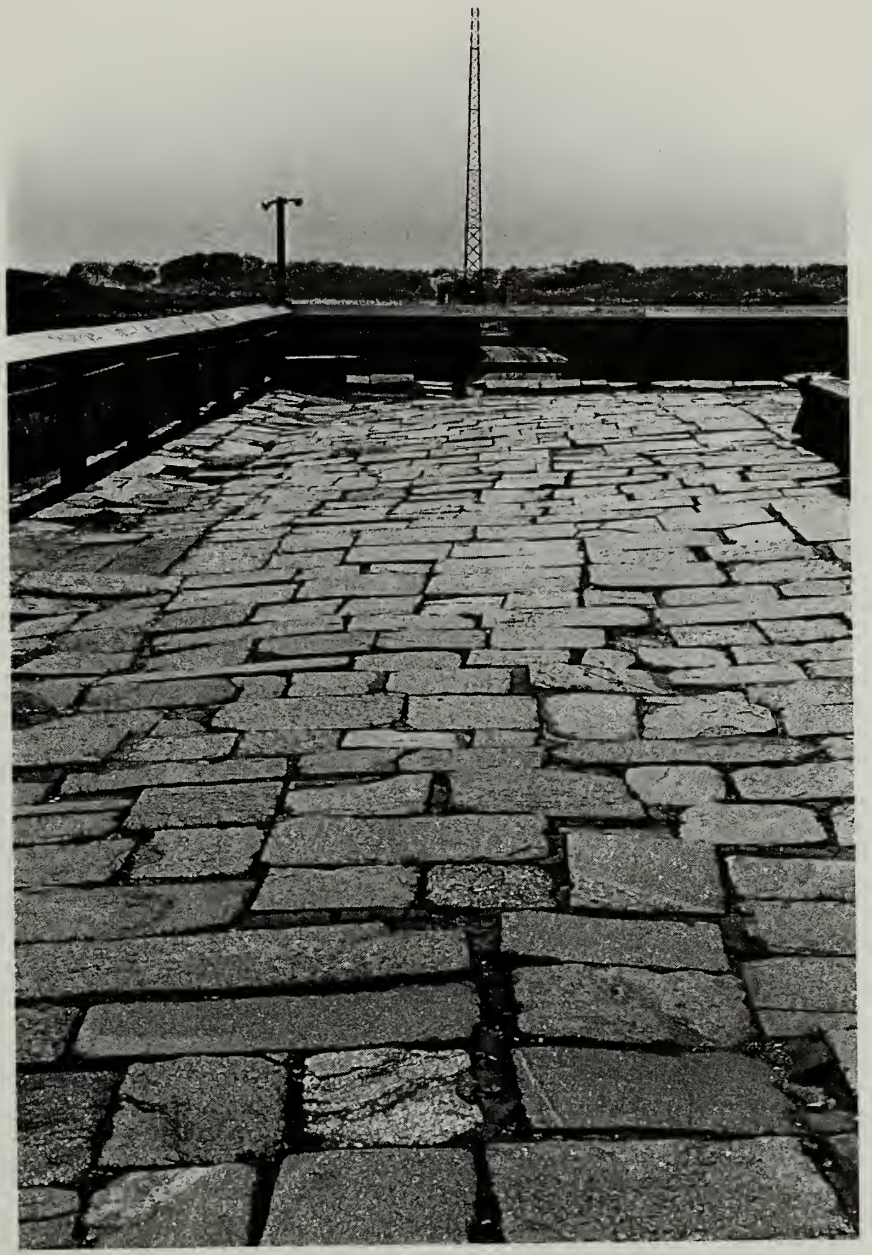


Figure 44. Terrace: flagging stones (1983).



Figure 45. Terrace: concrete slab marking former privy location, north of tower (1983).



Figure 46. Terrace: paint locker, in northeast corner (1983).

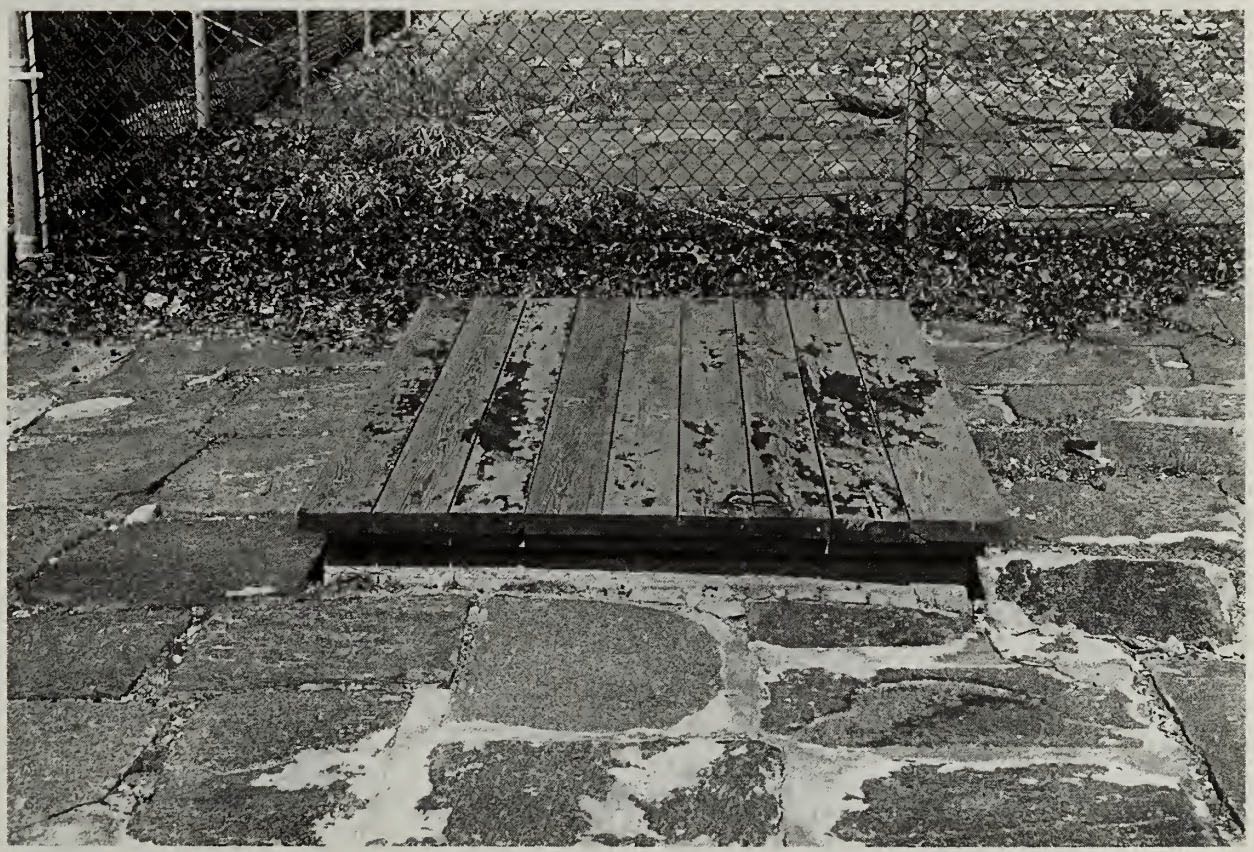


Figure 47. Terrace: pump location, northwest of dwelling (1983).



Figure 48. Terrace: west embankment wall, with fence, stairway, and overgrowth (1982).

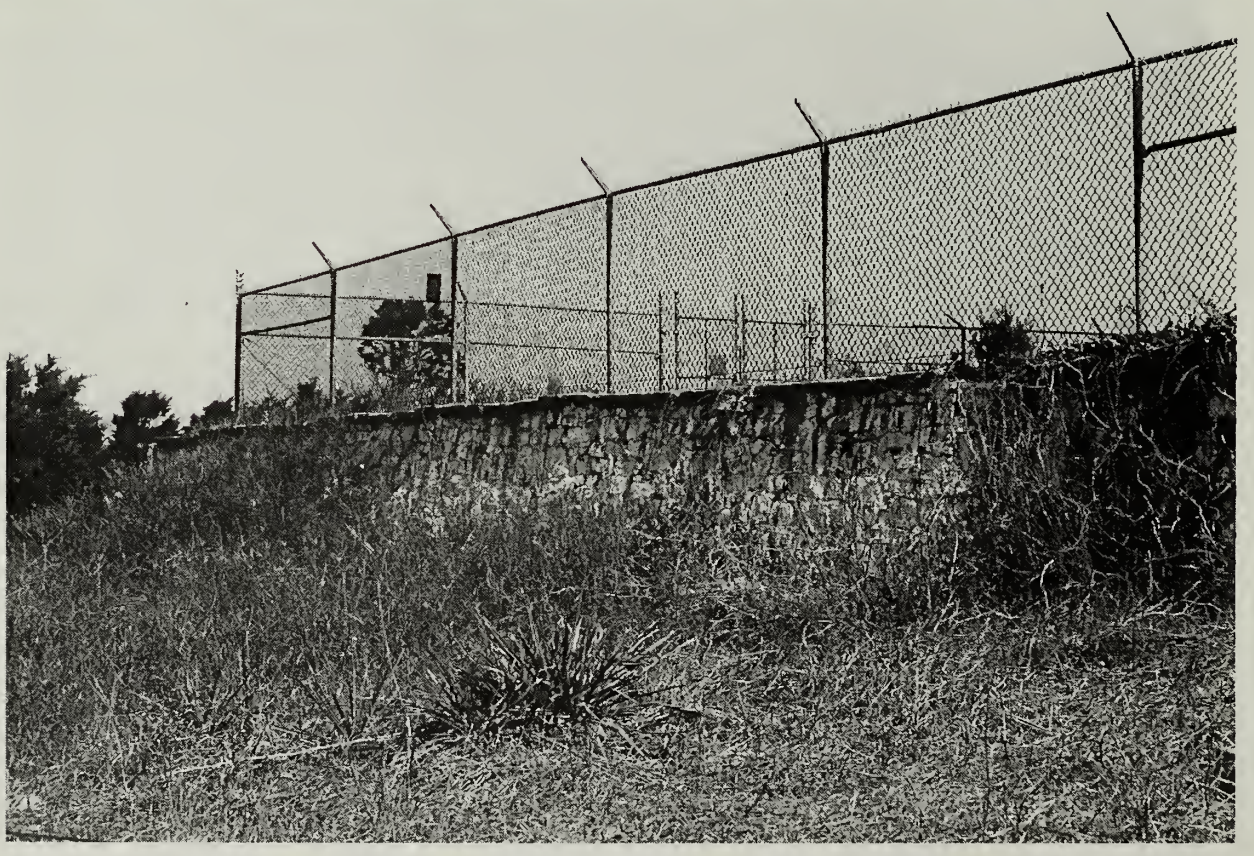


Figure 49. Terrace: west embankment wall and chain-link fence around tower (1983).



Figure 50. Terrace: wooden and chain-link perimeter fences (1982).

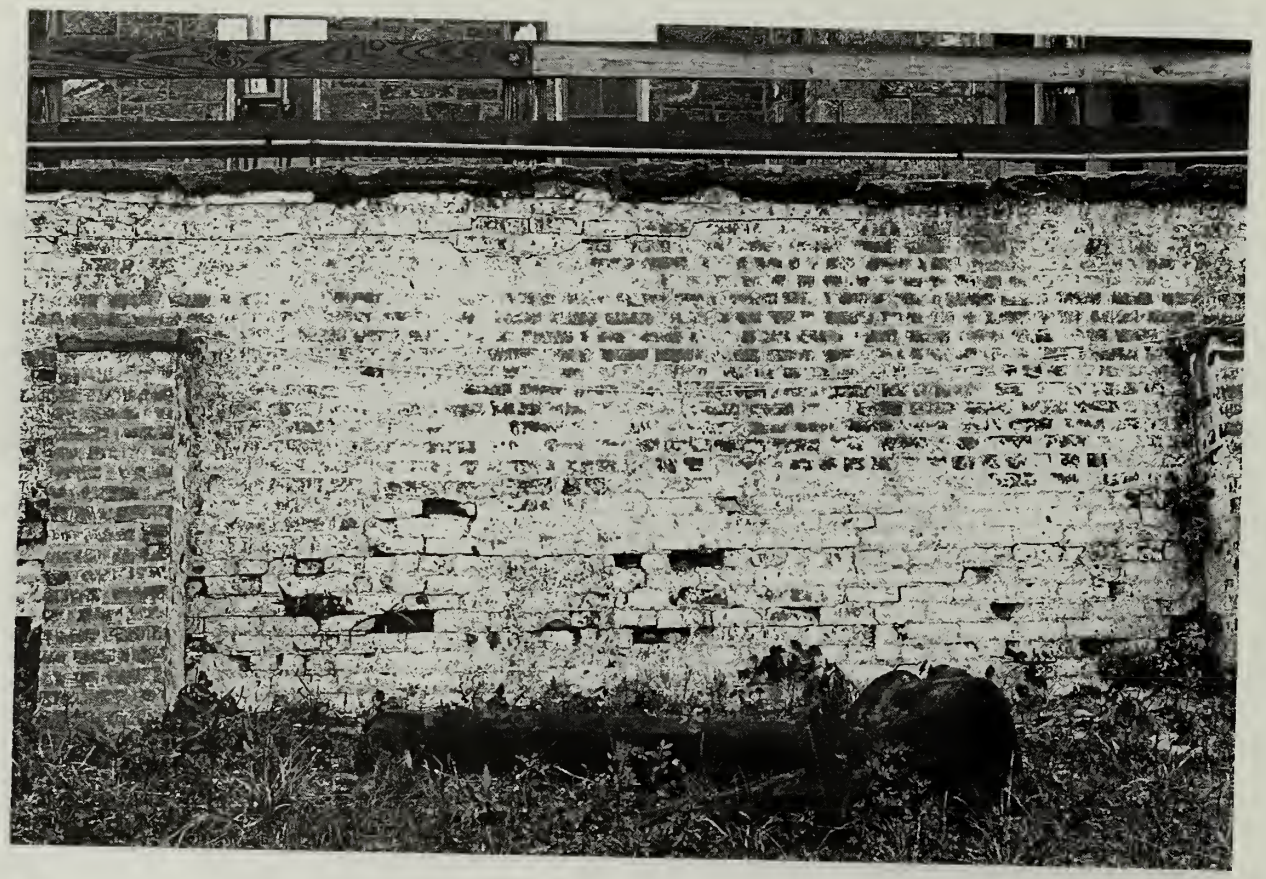


Figure 51. Terrace: south embankment wall, brickwork (1982).



Figure 52. Terrace: south embankment wall, brick buttress (1983).



Figure 53. Terrace: east embankment wall, stonework (1982).

OUTBUILDINGS

Paint Locker

The paint locker (fig. 46) dates to the early 1950's; it was in place by 1956 (figs. 39-40). The archeological report done on the site makes the following comment about the foundation upon which the paint locker sits:

> The concrete foundation of the oilhouse was visible on the northeast corner of the lighthouse pier beneath the present paint locker (the locker was erected during 1950). The oilhouse foundation measured 10 feet by 10 feet. The form and structural materials of the concrete foundation were similar to those of the concrete powerhouse foundation west of the Lighthouse....[1]

According to documentary sources, the oil house was constructed in 1888, and the powerhouse in 1894.

Location On northeast corner of terrace, facing west.

Design A one-story metal structure, the paint locker measures 10 by 14 feet. The locker rests on a concrete slab foundation that apparently dates to the introduction of the extant structure. This slab was poured over an already existing foundation of concrete. The structure features only one doorway located off center on the west elevation. The words "PAINT LOCKER" have been stenciled above the doorway in black. The roof is a metal shed-type with raised seams.

Finish Yellow paint (zinc chromate).

Condition Requires repair and maintenance.

[1] Elizabeth C. Righter, "Final Report on a Document Review and an Archaeological Reconnaissance of the William Floyd Estate and the Fire Island Lighthouse Tract, Fire Island National Seashore, Suffolk County, New York" (Jack McCormick & Associates, Inc., for the NPS, May 1977), p. 85.

Transformer Vault Building

Presumably the transformer vault building was constructed in conjunction with the introduction in 1939 of the underground electrical service at the Fire Island Light Station. Figure 38, dated March 29, 1948, includes the vault in a site plan for the electrical service, with a note stating "vault by others."

Location At ground level, east of tower.

Design The transformer vault building measures 9 by 15 feet. The structure has a flat roof, and is constructed of concrete blocks. The doorway is located on its east elevation.

Condition Fair condition.

Finish White paint.

CHAPTER 5.

THE LIGHTHOUSE: ARCHITECTURAL HISTORY

INTRODUCTION

Towering over the keeper's dwelling is the freestanding, black-and-white striped lighthouse. Originally, the lighthouse connected with the keeper's dwelling, to its south, via a covered passageway. This passageway was demolished ca. 1950.

The tower is recorded as measuring 140 feet to the cornice; 152 feet from the base of the structure to the cowl of the lantern; and 168 feet to the focal plane of the lantern above the mean sea level. Circular in plan, the lighthouse is 32 feet in diameter at its base.

Resting on a stone and concrete foundation, the tower's base is skirted by a plinth of tooled granite. Emerging from the plinth is the brick shaft. The shaft is conical in shape, based upon a hyperbolic curve. It becomes cylindrical near the top, where it is finished off by a projecting stone cornice. The cornice supports the brick Watch Room and the iron first-order lantern and balconies. (The term "balcony" is employed throughout this report because it more accurately describes the feature, although historically the term "gallery" was commonly used.)

The shaft, below the cornice, is punctuated by 11 openings: an arched entryway at the base on the south elevation; seven windows, which are related to the interior stairway landings; and three additional windows, round in shape and positioned in the frieze on the north elevation. The stairway landing windows are set in arched niches featuring double casement sashes, while the roundel window openings have been filled with plywood.

The exterior brickwork of the tower was covered with a reinforced concrete coating in 1912. This coating is as much as three inches thick in some areas, and has obliterated a substantial portion of the architectural embellishment at the neck of the shaft. A row of blind niches that encircled the neck survive, but one has been fitted with a window. These niches were originally separated by pilasters of raised brick with Doric capitals of granite. The stone capitals survive, but the pilasters have been obscured. Above the Doric capitals was a frieze of brickwork in relief, topped by stone dentils. The brickwork has been covered in this location, as well. The brickwork extends beyond the projecting cornice, to enclose the Watch Room. Originally it was finished with a denticular cornice, which is no longer exposed.

The Watch Room exhibits an arched opening on the south elevation, which contains a doorway that leads to the lower balcony. The balcony is fitted with a cast-iron railing.

The first-order lantern surmounts the entire structure. Sixteen-sided, it features three plates of glass per side. It is capped by a copper, raised-seam roof with projecting cornice. The roof is finished at its pinnacle with a ventilation ball and pinnacle rod. The lantern is fitted with an exterior railing, posts, bird guard, and braces. The lantern's deck is cast iron.

Currently, remnants of the reflector antenna brackets installed in 1958 are attached to the lantern's deck. Along the north elevation of the lantern and tower are remains of the lightning conductor, partially detached and nonfunctional.

The tower is painted in a pattern of black and white horizontal bands–two white and two black. The extensive loss of the protective coating has destroyed the pattern, however.

The interior of the tower features, from the ground up:

- an arched doorway, with four-paneled door and fanlight, that leads to an arched hallway that runs through the tower wall;
- a central stairwell with 150 spiraling, cast-iron winder steps;
- a room at the uppermost of the tower's six landings;
- a Service Room;
- a Watch Room, encircled by a lower balcony; and
- a first-order lantern with modern light apparatus, encircled by an upper balcony.

TOWER

Original Construction

According to the Lighthouse Board's 1858 annual report, the building of the second Fire Island lighthouse commenced in the summer of 1858. The preparation of plans and the ordering of materials had begun much earlier, as indicated in the building's 1857 annual report (App. C-l):

> A wharf, store-house, and temporary barracks for the accommodation of the workmen have been constructed, and the greater part of the material required for the construction of the tower has been procured and landed at the site, and it is expected that the tower will be completed and ready for exhibiting the first order lens from it by the middle of the next summer.

Responsibility for the design and construction of the new lighthouse fell to the engineer for the district in which the light was located–in this case, the Third District. The new lighthouse would be of the first order, and there were certain standard features that the Lighthouse Board required. However, the engineer in charge could employ artistic license in the design, so long as he did not jeopardize the budget or intended service of the structure. The Third District's engineer in 1857 was Lieutenant J.C. Duane of the Army Corps of Engineers. The lighthouse design is primarily the product of Lt. Duane's efforts. He prepared the drawings, procured most of the materials, and saw the work begin. However, Duane had been succeeded in the post of Third-District engineer by Lieutenant James St. C. Morton, also of the Corps of Engineers, by March 1858. It was Lt. Morton who supervised the construction of the second Fire Island lighthouse. He followed the project through to completion, considering it to have been his most important work to date (App. C-61).

Specifications and Drawings

The original specifications for the construction of the second Fire Island lighthouse have not been located. Apparently, it was the policy of the Office of the Lighthouse Board to prepare standard specifications for lighthouses depending upon the class of lens and the type of material to be employed. These standard specifications were printed by the Government Printing Office. Appendix D-1 is an example, entitled "Specifications for a First Order Light-house (Brick Tower)," prepared at the Office of the Lighthouse Board, October 1861. Accompanying these specifications was a portfolio of drawings. (These drawings have survived in the National Archives, and a select group has been placed on file at the NCRC.) Presumably the standard documents–specifications and drawings–would be dispersed to the districts. The district engineer would then select and choose relevant details to aid in the final production of specifications and drawings for his particular project.

Although dated three years later than the construction of the second lighthouse at Fire Island, the 1861 specifications for first-order lighthouses describe many features found in the Fire Island lighthouse. These items will be discussed more thoroughly in subsequent sections of this report.

Several drawings conjectured to be original were uncovered during the research for this historic structure report. They include:

figure 6 - east elevation of tower and dwelling, n.d.
figure 54 - structural plan of the tower, dated June 2, 1857,
figure 56 - structural plan, n.d.
figure 213 - cellar plan of keeper's dwelling, n.d.
figure 214 - ground level plan of the tower, covered passageway, and dwelling, n.d.

Appropriations

Commander Thornton A. Jenkins, secretary of the Lighthouse Board, notified Lt. Duane on March 24, 1857, via letter (App. C-3) that Congress at its recent session had made an appropriation of $40,000 for rebuilding the lighthouse at Fire Island. Jenkins further delineated the breakdown of the appropriation: the first-order revolving apparatus was to be set down in round figures at $10,000, leaving $30,000 for the tower. It was stated that the tower should not be less than 150 feet in terms of focal plane above mean low water. Comdr. Jenkins requested that Duane, as Third District engineer, give "early attention" to the subject, because of the importance of a first-order light at that location.

By April 8, 1857 (App. C-5), Lt. Duane notified the Lighthouse Board of the following:

> ...the appropriation for rebuilding the Light House at Fire Island will be reduced by the purchase of a Lantern and illuminating apparatus to about $25,000. This sum will not probably be sufficient to erect a Tower of the required size -- even if brick were employed. This material does not appear to me to be any means adapted to a work of such importance and in such an exposed situation. I would therefore recommend stone to be used in this case. The present appropriation would be sufficient to build the Tower and probably the Lantern, leaving the apparatus to be purchased from a new appropriation or some other source.

Cost Estimate

Lt. Duane submitted his cost estimate for the lighthouse at Fire Island on June 1, 1857. The total cost was set at $32,345 (App. C-10):

800 tons Brick	8000
1200 lbs. cement	1500
Stone for foundation 4700 ft.	2820
Concrete for foundation 650 yards	3250
Stone steps 160	1600
Stone for Cornice 500 ft.	500
Cast Iron 2500	1000
Stone Floors 300 ___ ft.	300
Wrought Iron ladders, railings, &c.8000___	200

Work	Masons 1610 days	4000
"	Carpenters 250 days	500
"	Stone Cutters 150	375
"	Blacksmiths 150	300
"	Laborers 2000	2500
Freight		4000
Machinery Tools, etc.		1500
Total		$ 32,345

On June 3, 1857 (App. C-11), the Lighthouse Board responded:

> Your design and estimate for the rebuilding of the Fire Island Inlet Light House have been received and referred to the Board.
>
> I have been directed to inform you that they are approved, with one exception, and that you are authorized to proceed with the construction as soon as the money is available, which will be on July 1, 1857.

The exception related to the system of iron ties introduced by Lt. Duane into the structure. This item will be discussed below.

Materials

Despite Lt. Duane's reservations about constructing the tower of brick, this was the material finally chosen. Presumably, the overriding factor was cost. In April, Lt. Duane was still seeking cost data on building in stone. A letter from a stone manufacturer dated April 6, 1857 (App. C-4), notified Duane of the cost for delivery of "50,000 cubic feet–more or less, of granite ashlar for Light-House with bids and builds roughly duped, but well formed" delivered to the site at a rate of 65 cents per cubic foot; at a wharf in New London, Connecticut, for 53 cents per cubic foot; and to Newark Bay, New Jersey, for 61 cents per cubic foot.

By May, Lt. Duane had apparently altered his thinking, and now was seeking to construct the lighthouse tower in brick with a granite base. Correspondence dating to May 26, 1857 (App. C-6), has Lt. Duane writing to Charles Page of Danvers, Massachusetts (a brick manufacturer):

> I wrote some ten days since requesting you to make proposals for delivering 800 tons Bricks at Fire Island, the first lot to be delivered about the middle of July.

On May 29, 1857 (App. C-7), Charles Page responded to Lt. Duane as follows:

> I regret that I did not receive your letter which was written previous to this, requesting me to give you my proposal for supplying you with the ? ? bricks at Fire Island on account of making arrangements for burning my first kilns -

> I think however I can furnish you the bricks as fast as you will want them at the same price that I furnish this lot, notwithstanding bricks are higher at present than they were in the Spring. That is $10.00 per ton on board the vessel.

The letter continues with discussion regarding the delivery of materials.

E.N. Hubbell of Coxsackie, New York, also offered a proposal for bricks dated June 16, 1857 (App. C-14), as follows:

> I hereby offer to deliver at Fire-Island as many good hard burned brick selected as you may require to build the Light House at that place for Eight ($8) Dollars per ton if burned in the ordinary way, but if burned without the use of coal Eight Dollars, Fifty Cts per ton.

Beals & Janes, a stone manufacturer, told Lt. Duane in a May 29, 1857, letter (App. C-8) that

> We propose to furnish the Granite for Foundation of Fire Island Light House as per Plans and deliver the same at Fire Island for the sum of eighty cents (.80) per cubic foot.

Two other proposals for stone delivery were submitted (Apps. C-12 and C-13). The stone contract went to Messrs. Bodwell & Webster of Vinalhaven, Maine, as noted in this letter to them from Lt. Duane, June 24, 1857 (App. C-18):

> I have decided to accept your proposal as made to Mr. Kimball for the delivery of the rough stone at Fire Island viz Forty cents (400) per cubic foot. I shall have them cut myself at Fire Island -
>
> I shall require the stone for the first course by the 15th of July and the remainder as soon thereafter as may be possible - you will please advise me what will be the longest time required by you to deliver the whole.
>
> The stones are to be quarried of the proper sizes to cut as per enclosed drawing -

Several letters followed concerning the transport of the stone, with the first shipment arriving around July 20, 1857 (see Appendices C-21, C-22, and C-23).

Correspondence of a fragmented nature has survived related to the procurement of timber (Appendices C-27, C-28). No direct reference to the stock ordered is found, however. Stevens, Starkey & Co. of Deep River, Connecticut, was one supplier: the firm submitted an invoice of $800.33 on July 23, 1857, for "Timber &c forwarded to Fire Island by Sloop Star."

William Lane, the overseer of the project, wrote Lt. Duane on August 15, 1857 (App. C-29), notifying him of the building materials and supplies that had arrived on site, and of others that were required.

> ...there has been received at this work two cargoes of Rough Stone for concrete one of 55 tons and one of 25 tones [sic]...
>
> The two cargoes of brick have been landed.
>
> There will be required as soon as you can make it convenient 400 barrels cement.
>
> Also 1450 running feet of 4" x 4" Maple [?] Joice [?] for one track commencing at the dock and running as far on shore as to the center of the Light House.
>
> Also 180 tyes [sic] about 7 feet each - 4 feet apart.

Lt. Duane had his assistant, F.J. Dominick, request additional stone from Bodwell & Webster on August 28, 1857 (App. C-30), as noted below:

> ... there will be required at Fire Island thirty two pieces of granite as follows
>
> | | | |
> |---|---|---|
> | 16 pieces | - | 5 feet 6" long |
> | | | 1 foot 8" thick |
> | | | 2 feet -" wide |
> | and 16 pieces | - | 6 feet 4" long |
> | | | 4 feet 2" wide |
> | | | 9" thick |
>
> These you may send with the remainder of your contract should you see fit to furnish them at the same rate (40¢ per foot) -

On April 9, 1858 (App. C-39), the newly appointed Lt. Morton requested "permission to purchase a hundred thousand hard brick for facing the tower." Lt. Morton, in his letter to the Lighthouse Board, expanded upon the need as follows:

> Lieut. Duane had intended to buy these brick if he could at this time anticipate getting enough money to do so, and still finish the tower: about $1,200.- to $1,500.- will be all the expense.
>
> I would not ordinarily write on such subjects, but in this case I knew it was your impression that no more brick were to be bought -

In its response (App. C-41), the Lighthouse Board instructed Lt. Morton to purchase the 100,000 bricks in the event that enough bricks had not already been purchased to complete this project. The board authorized him to purchase the Danvers brick.

Tools and implements for the construction of the second Fire Island lighthouse were ordered in 1858 as well. Lists including the types of tools, implements, and machinery employed are found in Appendix C (see C-24, C-34, C-36, C-37, and C-64).

Walls

Foundation

William Lane, the construction overseer, informed Lt. Duane on June 21, 1857 (App. C-16), that he was "to take the Train tomorrow morning for Islip to see about the driving of the Piles required for Fire Island agreeably to your instruction." Following his trip to Islip, overseer Lane reported that he could obtain a pile driver and screw there for two dollars per day (App. C-20):

> It will cost $4 to take it to Fire Island, and the same to return it, I conversed with a person there who had driven a few piles in that locality, and he says they can be driven without any difficulty.

Exactly when the work actually commenced can not be determined from the existing records. The annual report for 1858 (App. C-1) describes the work as beginning in the summer of 1857. By then, most materials had been delivered to the site.

The original specifications for the second Fire Island lighthouse were not located. The 1861 specifications for a "Brick Tower" (App. D-1) offer the closest specification data, being a statement of the standard construction methods and materials employed for the particular building type under study. Pertinent sections are included here.

> Excavation. If the ground on which the tower is to be built is good and solid, the foundation pit must be excavated to the depth of ten (10) feet, and suitably leveled for the bed of concrete, which must be from two to three feet in thickness. But if, in the judgment of the Superintendent, the ground be not sufficiently firm to build directly upon, then it must be closely piled, and covered with a grillage of heavy timbers, say 12" by 12". The upper side of grillage to come within eight feet of the surface or ground.
>
> All excavated material to be graded around the premises, as may be directed. When the foundation is completed, the earth must be well rammed about it.
>
> Foundation. The foundation to be of good rubble masonry, in random courses, with level beds. The extreme diameter of the lowest course to be forty (40) feet. The largest stones obtainable must be used for this course.
>
> Concrete, or Beton. When concrete is used in the foundation it must be made as follows: one barrel of cement, two barrels of clean, sharp, fresh water sand, and one cubic yard of stone, will make a batch of concrete. The stone must be hard and sound, and broken to pass through a 2 ½" ring. The materials must all be measured. The broken stone having been spread on a bed of plank, the mortar must be spread evenly over it, and the whole mass turned over and thoroughly mixed with a hoe or shovel. When deposited in the foundation pit it must be carefully rammed.
>
> Mortar. The mortar for the foundation and all other parts of tower must be made with hydraulic cement, of the best quality, freshly burned, perfectly ground, securely put up, and kept dry until used. The sand to be clean, free from salt, and sharp gritted. The mortar to be mixed as it is used. The time from the first wetting of the cement until used in masonry must not exceed one half hour.

The only way to determine how closely the construction of the second Fire Island lighthouse's foundation followed these guidelines is to consult the extant drawings of the project. Fortunately, rather complete drawings of the foundation have survived. Figures 54, 55, and 56 show the foundation in plan and section. Figure 54–proposed by Lt. Duane and dated June 2, 1857–is the most detailed. It depicts five courses of granite foundation resting on, and infilled with, concrete. The granite slabs are laid radially in a cantilevered pattern.

Although the work began in the summer of 1857, the foundation work was not completed until the spring of 1858. The project was closed down in December due to inclement weather. Appendix C-40, dated April 9, 1858, describes the state of the foundation after experiencing its first winter. Apparently the recently appointed Lt. Morton had just visited the site, and was disturbed by the concrete filling of the foundation, as he reported to the secretary of the Lighthouse Board:

> I was on the 7th and 8th inst. at Fire Island, when it occurred to me to try, with a pick, the concrete filling of the foundation, which had a bad appearance.
>
> The work had been left off last December, when the next to the last course of facing stone, and its filling of concrete, had been laid: the concrete was therefore the layer which is 2 feet thick and which is from 2 to 4 feet below the level at which the brick tower rises.
>
> I found the concrete bad, and had a hole dug as large as a barrel , which went through this layer of concrete, and six inches into the under _____: specimens of each layer were removed by me for future reference.
>
> I regret exceedingly to have anything to complain of with respect to this concrete - I feel that it is a delicate business, but it would be assuming a great risk to my reputation to build on a foundation that might prove unreliable, and in a way that could not admit of any concealment.
>
> I found the concrete as far down as I got, (2'6") quite friable and porous: the mortar could be reduced into a powder between the fingers, easily; it was in fact no stronger than hand made.
>
> It had every appearance of a surplus of sand, too much water in the mixing, and not enough _____.
>
> At the same time it is possible that this upper layer, and the next, had been injured by the frost - this would account equally well for the appearance of the concrete, and would explain its dampness, which I cannot well explain otherwise.
>
> Now it is not very probable that any great damage will immediately result from building on this foundation, provided the two courses of concrete alone are inferior: the tower will press equally on all parts, and the facing of granite will exclude frost. At the same time, the weight of the tower would in the course of _____ occasion some settling in the mass which would crack and disfigure the tower, and there is a certain possibility that the tower might soon be ruined by some granite giving way of its bed.

> After a long deliberation I respectfully recommend that I may be allowed to remove as many courses of this present foundation as are bad masonry; it will not cost much: the concrete can be sifted, and the broken stone be used again.
>
> The loss of time can be made up by allowing me to go to work with a force calculated on the supposition that you will find the funds out of some other appropriation: I will engage to complete the work this season in that case.
>
> I have at present about half a dozen masons at work, cutting brick and laying the last course of the foundation, which ought to be done today: I would not alter any of the existing dispositions before obtaining your authority.
>
> With regard to concrete it is proper I should mention that I have had every opportunity to become a good judge of it, and of cement.

The Lighthouse Board immediately responded to Lt. Morton's request (App. C-41) on April 10, 1858. The board did not approve of his recommendation to take down part of the foundation. On April 12, 1858 (App. C-42), Lt. Morton notified the board that he would proceed with the original plan, assuring them that work went on without interruption while awaiting reply; and that he, in fact, would send a "large increase to the force at Fire Island" the next morning. The board's refusal to accept Lt. Morton's suggestion did not remove his anxiety over the condition. He offered another proposal in the April 12th letter, as follows:

> To make sure of the foundation at Fire Island I propose to put a double number of the iron bands used by Lt. Duane, in the lower ten feet of the tower: these bands you will recollect are embedded in the brick work, and effectually prevent any spreading or cracking: the additional expense will be very little, the bands or anchors being made on the spot, and the additional strength will be very considerable.

The board on April 14, 1858 (App. C-44), approved an increase in the number of iron bands in the lowest 10 feet of the tower. The issue of the potential instability of the foundation was finally laid to rest in a postscript to an April 19, 1858, letter (App. C-46) to the board from Lt. Morton:

> I am glad to state that the concrete samples that I took from the F.I. foundation have become much firmer, and quite hard in fact, by being allowed to set in a warm room.
>
> You will recollect that I proposed to wait the issue of this trial before taking up much of the concrete.

Shaft

Very little data has been uncovered thus far that describes the actual construction of the tower above ground. Several items included in the 1861 specifications (App. D-1) relate to the building of the Fire Island tower, as described here.

> Plinth. The two courses forming the plinth of tower to have square beds and builds; the face to have chisel draughts 1 ½" wide all around; the intermediate surface to be dressed off roughly with a pick.

> Brickwork. The brick used throughout must be of the best quality, firm in texture, hard burned, and laid in the most solid manner, with full beds of mortar.
>
> Solid Cornices. The cornice of tower to be of stone.... The upper surface to be patent hammered. All other surfaces, including beds and builds, to be rough hammered.

The structural design of the tower has remained virtually unaltered from its original construction in 1858. The second Fire Island lighthouse is constructed of brick with a stone plinth and stone cornice. The tower is round in plan. The tapered shaft is 140 feet high to the cornice's top, with its batter based upon a hyperbolic curve. The formulation of the batter is included in figure 56.

According to figure 54, the wall of the tower was to consist of three concentric rings of brickwork. The inner one would be thin and cylindrical, extending up to the room at the sixth landing. The middle one would be about twice as thick, also cylindrical, but not as tall. The outer one would be concave, tapering inward as it rose to meet the middle ring. At its base, this outer ring would consist of two separate rings, which would unite after about 21 feet of rise, to form a single, outer ring.

These concentric rings of brick were to be reinforced by eight radial brick walls. This would leave shafts between the rings, which would serve as drainage and ventilation cavities. The shafts between the inner and middle rings would number 14, and extend the entire height of the inner ring. The shafts between the middle and outer rings would number nine at the base–seven large ones and two adjacent small ones, one on either side of the entry hallway. Higher up, above the entry hallway, the two small shafts would unite to form a single shaft. Between the inner and outer rings of the main outer ring, the number of radial walls would be increased to 16. This would form 16 shafts, but since the two rings merge after only 21 feet, these shafts are only 21 feet high.

Figure 55 is a recent (1962) elaboration of part of figure 54, depicting the tower's drainage shafts in plan and section. The total thickness of the tower wall is 10 feet, 9 inches at ground level.

Figure 54, and thus also 55, is incorrect in several respects, according to figure 56. Figure 56 is apparently slightly later than figure 54, because it omits the original concept of stone steps, and shows instead the cast-iron steps that were actually installed. It also omits the inner ring of brickwork seen in figure 54. This ring may have been designed to support the stone steps, and so would have been made unnecessary by the cast-iron steps.

No specific details of the wall's construction were uncovered in the documentary research, other than a reference to iron ties made in the board's approval of Lt. Duane's cost estimate and design dated June 3, 1857 (App. C-11). The board approved Lt. Duane's work with the following qualification:

> The exception referred to is the system of iron ties introduced by you. The Committee of Engineering is of the opinion that the walls joining the inner cylinder to the outer walls might be materially strengthened by the introduction of [?] or sheet iron ties running from the cylinder to the outer walls, and having their ends turned up, but does not approve of the horizontal rings.

As noted earlier, Lt. Morton would later request, and receive, permission from the board to double the number of iron ties proposed by Lt. Duane.

Actual work on the tower apparently proceeded throughout the summer of 1858 without delay or significant problem, as a letter dated May 27, 1858 (App. C-51), from the board to Morton implies:

> I have received your letter of the 26 inst. I think you are getting along very well with the Fire Island work, and as you are up 20 feet now, and are through with the cutting of the brick. I think you can average nearly if not quite a foot a day hereafter. This would about finish the brickwork by the first of October. But is it not possible to get the lantern & apparatus up by that time, so that we can light up on October 1? If you think it is, send on a description of the tower giving its position with reference to the old tower and such other facts as ought to be printed in the notice, and it will be printed here over your name. The color is to be yellow.

The exterior ring's brickwork is laid in English common bond, while the interior ring is laid in header bond.

Just as the plans for the structural design of the tower underwent revision (fig. 54 vs. fig. 56), the plans for its decorative detail were changed. Figure 6, which is undated but thought to be an original construction drawing, shows the upper quarter of the tower embellished with decorative stone and brickwork. This design varies in detail from the work actually performed.

The drawing depicts–at the tower's neck, encircling the shaft–large blind arches separated by large pilasters with Doric capitals. There is no architrave above the pilasters, but there is a frieze area. This is formed by shorter pilasters, superimposed on the large ones and separated by groups of three small blind arches. The capitals of the shorter pilasters merge with two courses of corbeled masonry that form the lower part of the cornice, or corona. The upper part of the cornice, or cymatium, is represented as being ogee in form, flaring out above the corbeled section. Figure 6 also depicts the wall surface of the Watch Room as a series of vertical lines. What this represents is not known.

Some of these features seen in figure 6 were in fact employed during construction, while others were not. The tower's neck (fig. 11) was embellished with six large brick pilasters that rise out of the wall of the tower, such that their relief grows deeper as they grow taller. These are separated by blind arches, as drawn, except that the east arch is a window. The pilasters are finished off with an astragal and molded capital of stone. The capital is of the Doric order, featuring a quarter-round echinus and an abacus. The capitals "support" a taenia and frieze consisting of ungrooved triglyphs separates by plain metopes. The triglyphs are connected near their bottoms by a raised band of brickwork, as would be expected with the Doric order. The triglyphs are topped by stone Doric capitals. These capitals help support a projecting stone corona that does, in fact, support the lower balcony encircling the Watch Room. The Watch Room's walls have a corbeled brick dentil course for a cornice, which helps support the upper balcony encircling the lantern.

Figure 11 indicates that the balconies' railings were built according to figure 6. They had similarly shaped posts: rod-like, with round finials. The lower balcony had three rails, however, while the upper balcony had but one.

Lt. Morton exercised some artistic license towards the end of the project. Writing to Edward Hall, Superintendent of the Works at Fire Island, on August 27, 1858 (App. C-60), he directed the following:

> I want you to make 3 round windows one foot diameter each, one to be above the row of windows on the N. side or opposite side from the door into the tower and one on each of this, over the blank windows.
>
> The centre of each window is to be in the exact centre of the space between the brick belt and the lower course of the cornice, and in the space between the projection.

Doorways and Windows

Doorways

Three doorways currently exist, all apparently original to the structure. They were designed into the brickwork as follows: at ground level, on the south elevation; in the interior partition of the sixth-landing room; and at the Watch Room, on the south elevation. The ground-level entryway and Watch Room doorway have semicircular arched heads, while the doorway in the sixth-landing room features a straight head.

Figure 56 depicts a sketch of the entry doorway with a three-light fanlight above. The hinges are designated as being on the east side, with the lock on the west. The placement of the door–recessed from the exterior wall plane–is defined as well. Descriptions of three doors are included in the 1861 specifications, but they do not appear to be similar to those introduced into the second Fire Island lighthouse.

Windows

Documentary data is virtually nonexistent for information on the original construction of the windows for the second Fire Island lighthouse. Figure 6 provides an insight into the original intention, which apparently was carried out. A window is shown on the shaft's east elevation in this figure. The window is set in an arched niche. The sashes are shown as double casements with 10 lights per casement, and a fanlight with eight lights above. Figure 54 includes four arched openings centered along the shaft. These openings, as drawn, were not followed through in construction. The tower was fitted with seven arched windows whose openings have remained unaltered. The sashes and trim have undergone repairs and minor alterations, however.

A note on figure 56 states: "The first window will be above the first landing, which is to be at 19' 9-3/4" from the ground floor." Finally constructed were seven windows, as follows:

- three on the west-southwest side;
- two on the east-southeast side; and
- two on the north side.

Interior Plan

The interior plan of the lighthouse has survived as constructed. It features an arched passageway at the ground level, leading to the central stairwell. This main stairwell is cylindrical in shape, and open to the level of the sixth landing. At this level, a partition wall supported on an iron girder cuts the cylinder in half, forming a room half the size of the cylinder. Above this half-room is the service room, which is cylindrical with a column at its center. The service room is topped by the Watch Room, which is topped by the lantern.

Flooring

No specific reference has been located describing the intended flooring materials for the second lighthouse at Fire Island. Currently, the ground floor cannot be adequately studied because of the abundance of debris cluttering the area. Granite slabs are visible in the passageway. The 1861 specifications for a "Brick Tower" (App. D-1) note:

> The passages to, and floor of tower must be paved with encaustic tiles, blue and buff, solidly laid in cement.

Whether encaustic tiles were laid at the base is not known, but the possibility does exist.

The floor of the sixth-landing room has been covered over by concrete. The original flooring cannot be determined as a result. The service room appears to retain its original flooring material– timber clad with copper. Although the floor of the Watch Room is now of cast iron, evidence suggests that it, too, originally had a timber floor with copper cladding.

Stairways

Little is known of the actual construction of the tower walls, and even less is known about the erection of the tower stairway. Fragmented data may be gleaned from the surviving documents. According to figure 54 and the original cost estimate submitted by Lt. Duane, the original intent was to install stone steps. The cost estimate includes "Stone steps 160 for $1600."

A decision was made prior to construction to use iron steps instead. Figure 56 clearly shows that cast-iron steps were to be introduced: a central newel is drawn. A notation on the sketch states, "the stairs start true East." Appendix C-65 contains information extracted from the cost estimate for the new Montauk Point tower. The estimate states that "Iron stairs as at Fire Id will cost $957.44."

The 1861 specifications (App. D-1) include the following data related to metal steps, which can be applied to a greater or lesser degree to the Second Fire Island tower.

> Main stairway. The steps for main stairway to be cast iron...
>
> Surface of contact faced. The upper and lower surfaces of the hubs forming the central column of stairway must be turned, and the height of the steps must be made to an uniform gauge of eight (8) inches, U.S. standard measure. Each flight of steps to be temporarily erected together at the workshop; and each step must be marked or numbered with a chisel, according to its position.

> Iron castings, All iron castings must be made from remelted iron. All castings which are honeycombed, or otherwise imperfect, will be rejected.
>
> All parts of the iron work that have been planed, turned or finished, must be well smeared with a mixture of white lead and tallow to prevent rusting.
>
> Landings. Each landing is formed by two cast-iron plates one inch thick, partly bedded in the brickwork and partly resting on a cast-iron girder, whose ends are also secured in the brickwork of cylinder.
>
> Stirling's toughened iron. All the girders in the lighthouse must be made of Stirling's toughened iron - that is, of cast iron, with an admixture of about 20 percent of wrought iron turnings or scraps.

Another specification for the period described a cast-iron stairway as follows:

> The main tower stairway is supported by a center newell pipe of cast iron in sections. The steps are cast with a hub to fit over the newell pipe. The inside of the hub is bored to a smooth surface. The outside of the steps are supported by carriers. The plates are secured to each other and to a flange on the central hub that encircles the newell pipe.

This description resembles the type of construction found in the Fire Island stairway, and is included here for purposes of nomenclature.

At Fire Island, the main spiral stairway ascends in the central cylindrical stairwell from the lower part of the tower to the sixth-landing room, and is constructed entirely of iron. The carriers for the treads, the landing plates, the girders, and the flooring of levels above ground were built into the brickwork during the erection of the tower. The stairway is thus thought to be original.

There are also three other stairways of shorter length. They are found in the rooms at the top of the tower–the sixth-landing room, the Service Room, and the Watch Room. The 1861 specifications (App. D-1) include a description of a stairway for a Watch Room, but it does not apply to the one constructed at Fire Island, other than in this comment:

> The cast-iron treads to be checked or roughened on the upper side to the depth of 3/32" to prevent the feet from slipping.

All three stairways appear to be basically unaltered.

Finishes

The original interior and exterior finishes of each element will be discussed later, in conjunction with that element. The following excerpts from the 1861 specifications (App. D-1) relate to painting:

> Iron work. All the iron work of structure must be painted with two coats of white lead in oil, at the workshop; and when fixed in the tower, to receive two additional coats of green paint and one coat of varnish.

Woodwork. All the woodwork of structure to have three coats of white zinc paint. The doors must be grained in imitation of oak, and have two coats of varnish.

Interior brickwork. The interior brickwork must be painted with three coats of white lead in oil, well laid on.

Completion

On September 30, 1858, a report was submitted to the Lighthouse Board by Lt. Morton describing the rebuilding of the Fire Island lighthouse (App. C-61). The section relevant to the tower is included as follows:

> Here has been performed the most important work which I have been charged with viz: the erection of a 1st order Light House Tower, and Keeper' s Dwelling. The tower is of Brick, with a granite cornice, and rests upon a foundation of concrete faced with granite. There is a map of concrete under all the above, which is 6 feet thick and 50 feet in diameter, and thus gives an ample bearing and support to the superstructure.
>
> The bed of this concrete is about a foot below low water; and the brick work of the tower commences at the level of 14 feet above mean tide.
>
> From the foot of the tower proper to the top of the cornice is 140 feet, and the focal plane of the lens is 12 feet above the last mentioned level, so that the light is about 166 feet above the mean level of the sea.
>
> The tower is round and tapers very rapidly below, the batter however diminishes until the upper portion runs up nearly cylindrical. The curve used to determine this shape was a hyperbolae.
>
> The cornice is of the Doric order, and is joined to the tower by six pilasters which spring vertically from the inclined face of the tower.
>
> The tower is ascended by spiral stairs; the treads of cast iron open work, rest on wrought iron pieces and these are supported by the cylindrical wall of the tower and by a cast iron central hollow column.

Repairs and Alterations

1860's

An estimate was received in 1862 for painting the tower with three coats of oil paint. In 1865, the yellow exterior cement wash was scraped. Imperfect brickwork was replaced, and all joints were scraped and repointed with cement mortar. The exterior was then painted with three coats of oil paint. The main stairway was repaired and repainted, and heavy springs were installed in the newel. All of the above information came from monthly and annual reports (App. C-66).

1870's

Crumbled brick was replaced and repainted in 1871, and two coats of a yellow portland cement were applied to the exterior. Speaking tubes and an alarm bell were added to the tower. Three years later, it was noted that the tower leaked, so the exterior was repainted and given a cement wash. It was noted that the lightning conductor was not properly led. Three coats of paint were applied to the buildings throughout the site. The Watch Room's floor was resheathed in 1878. The tower, including hallways, received another cement wash. The next year, the exterior was thoroughly cement-washed again. New posts for the lower balcony railing around the Watch Room were made and fitted, and the handrails were repaired. A telegraph wire was attached to the tower in 1878. All of the above information came from monthly and annual reports (App. C-74).

1880's

It was noted in 1881 that the tower needed a new cement wash. In 1885, it was noted that the tower's bricks were chipped considerably, and that the exterior was slightly cracked in places. The storm door on the doorway from the Watch Room to the lower balcony was repaired in 1888. At that time, it was noted that other doors and windows required repair, and that the tower leaked. The base of the tower was cemented, and the tower deck and the areas around the windows were repointed. All of the above information came from monthly and annual reports (App. C-85).

1890's

It was noted in 1890 that the tower bricks were weather-worn and in need of repair. The following year, it was noted that the outside of the tower needed paint or a cement wash, and that pointing mortar was falling out and bricks were chipping. It was also noted that the main stairway needed a handrail. Some 300 gallons of asphaltic slag were applied to the outside of the tower, and the result was painted black with black and white horizontal stripes. In 1894, the Watch Room deck was pointed and grouted. The next year, the fourth-order lantern procured in 1894 was placed on a bracket on the south side of the tower, and the tower was repointed. A new bell pull was furnished for the tower in 1896; the iron door of the "Lantern" (Watch Room) was repaired; and the fourth-order lantern was removed. Telephone connections with the lighthouse were established May 5, 1898. All of the proceeding information came from monthly and annual reports (App. C-94).

1900's

Five pairs of knobs and three catches for doors were furnished in 1900. In 1901, three cells of a "victor dry battery" for the telephone were furnished. It was noted that a new door was needed for the "Lantern" (Watch Room). It was also noted that a new railing was needed for the lower balcony, and a machinist was sent to the site to take measurements for this. The contract for furnishing "cast-iron railing posts, railing &c" went to Allentown Rolling Mills, Allentown, Pennsylvania, for a bid of $124.06 (App. C-108). The following year, the new railing was installed. Figure 25 shows the new railing in place. The stanchions, or posts, are much bolder and heavier than those of the previous railing. Also in 1902, the hammers of the keeper's call bell were repaired, and a new hammer was furnished. September 1903 saw a new iron door fitted to the "Lantern" (Watch Room), as well as two new rollers installed on the outside storm door of the "Lantern" (Watch Room). In 1904, two brass speaking tubes were installed between the tower and the Watch Room.

All of the preceding information, except as noted, came from monthly and annual reports (App. C-105).

1910's

The doorway from the Watch Room to the lower balcony received a new door in 1911 (App. C-120). The tower received reinforcing bands in 1912, followed by the thick coating of reinforced concrete that obliterated so much of the original decorative detail (fig. 57 and Appendices C-122 to C-132).

1920's - Present

Few repairs or changes occurred during this period. Two sets of reflector antenna brackets were attached to the balconies in 1958 (fig. 58), and a third set was added sometime thereafter. The 1912 coating deteriorated to the point that in the 1960's, the Coast Guard considered resurfacing the tower (fig. 59). This did not happen. The door from the Watch Room to the lower balcony was replaced in 1962 (fig. 60).

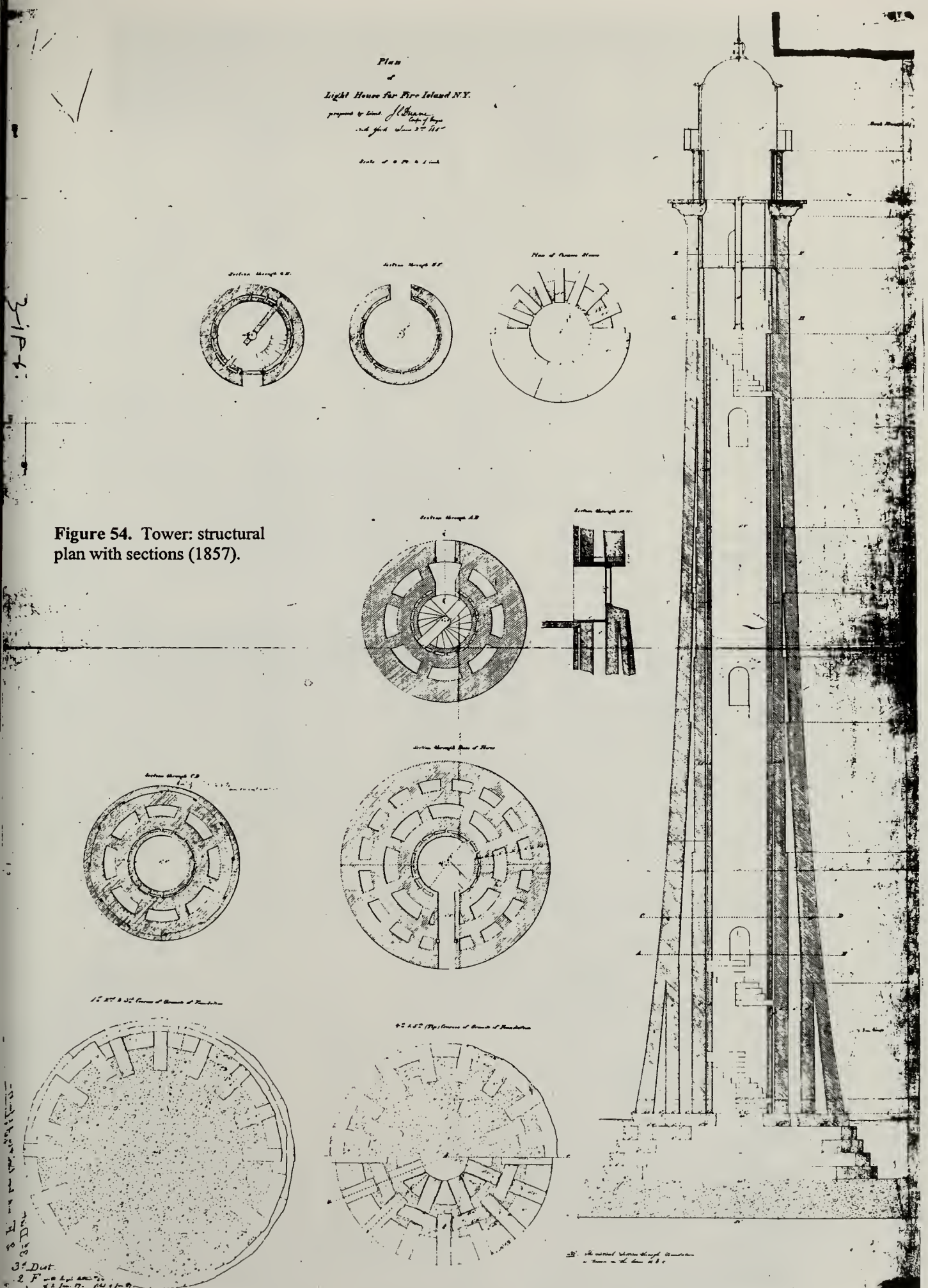


Figure 54. Tower: structural plan with sections (1857).

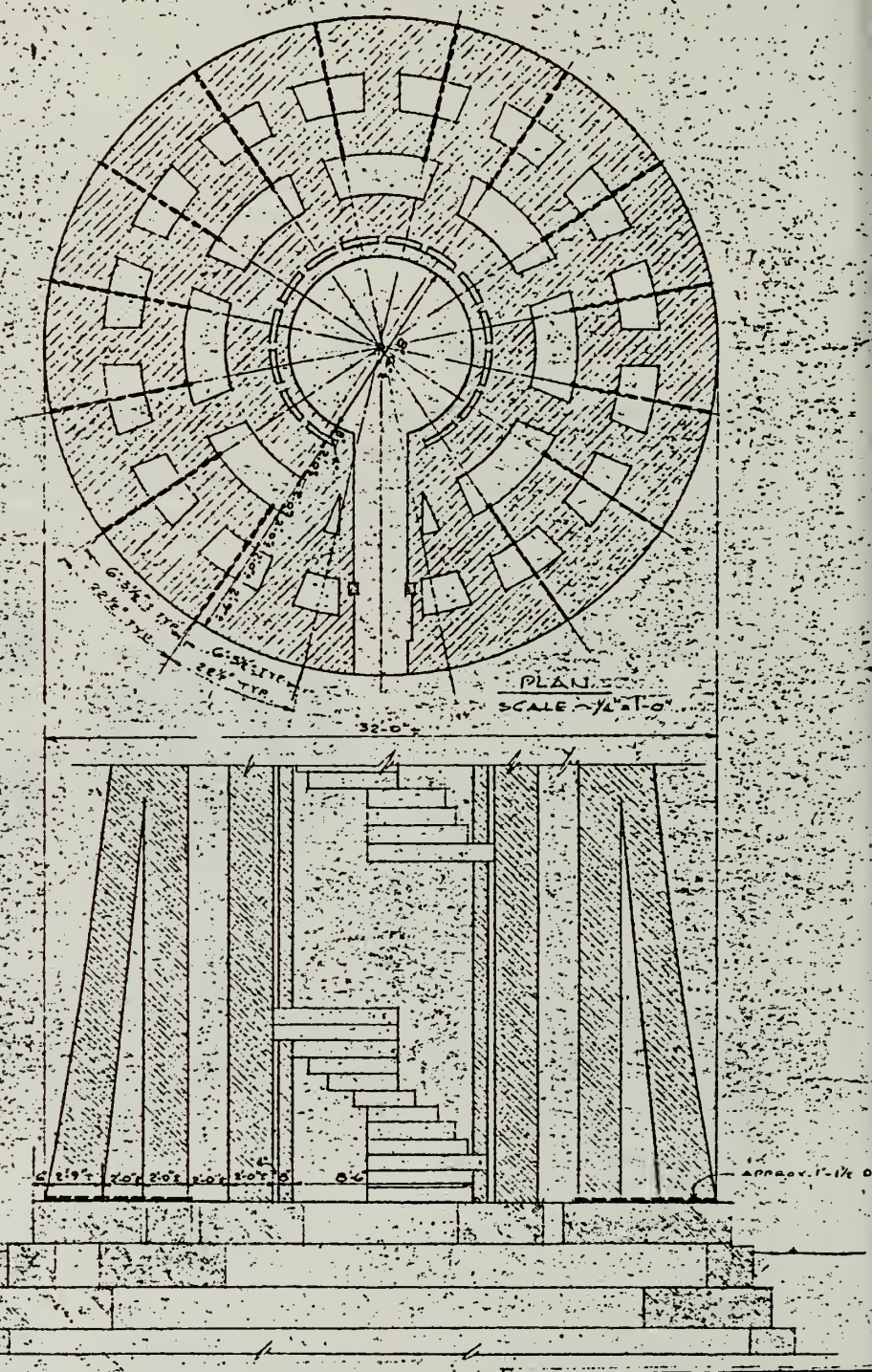


Figure 55. Tower: drainage plan and section (1857 and 1962).

REV.	DATE	APPD.	BY
U.S.C.G.		13 D DISTRICT	
		CIVIL ENGINEERING	
DE.			
DR.	AM	FIRE ISLAND LS. : FIRE ISLAND, N.Y.	
TR.			
CKD - L.E.		TOWER DRAINAGE PLAN & SECTION	
APPROVED		DATE	
CH. SECT.		ACTG. U.S.C.G. CHIEF OF DIVISION	
(ACTING)		C. G. DRAWING NO.	
		03-2594	
		SCALE 1/4"=1'-0"	SHEET 1 OF 1

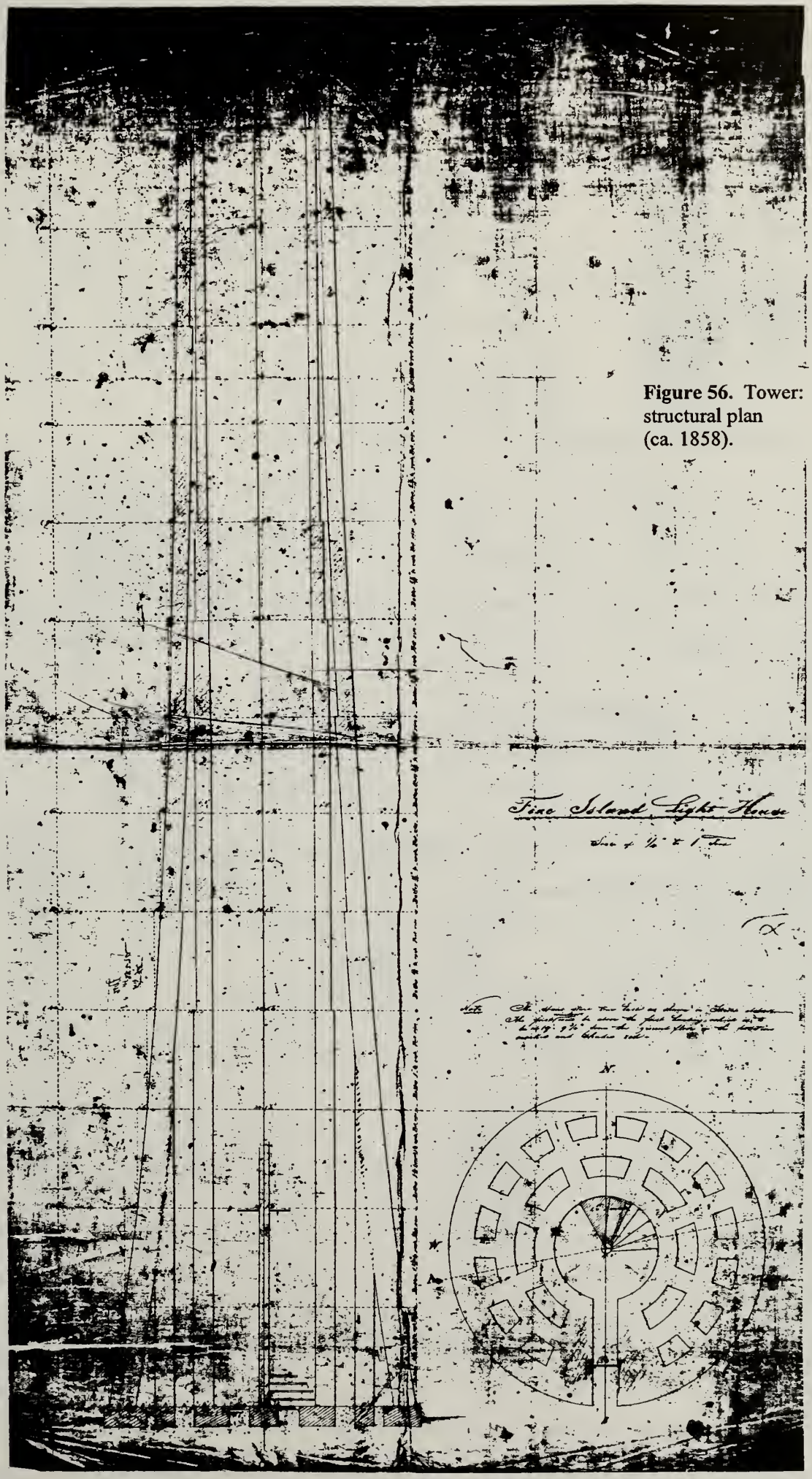


Figure 56. Tower: structural plan (ca. 1858).

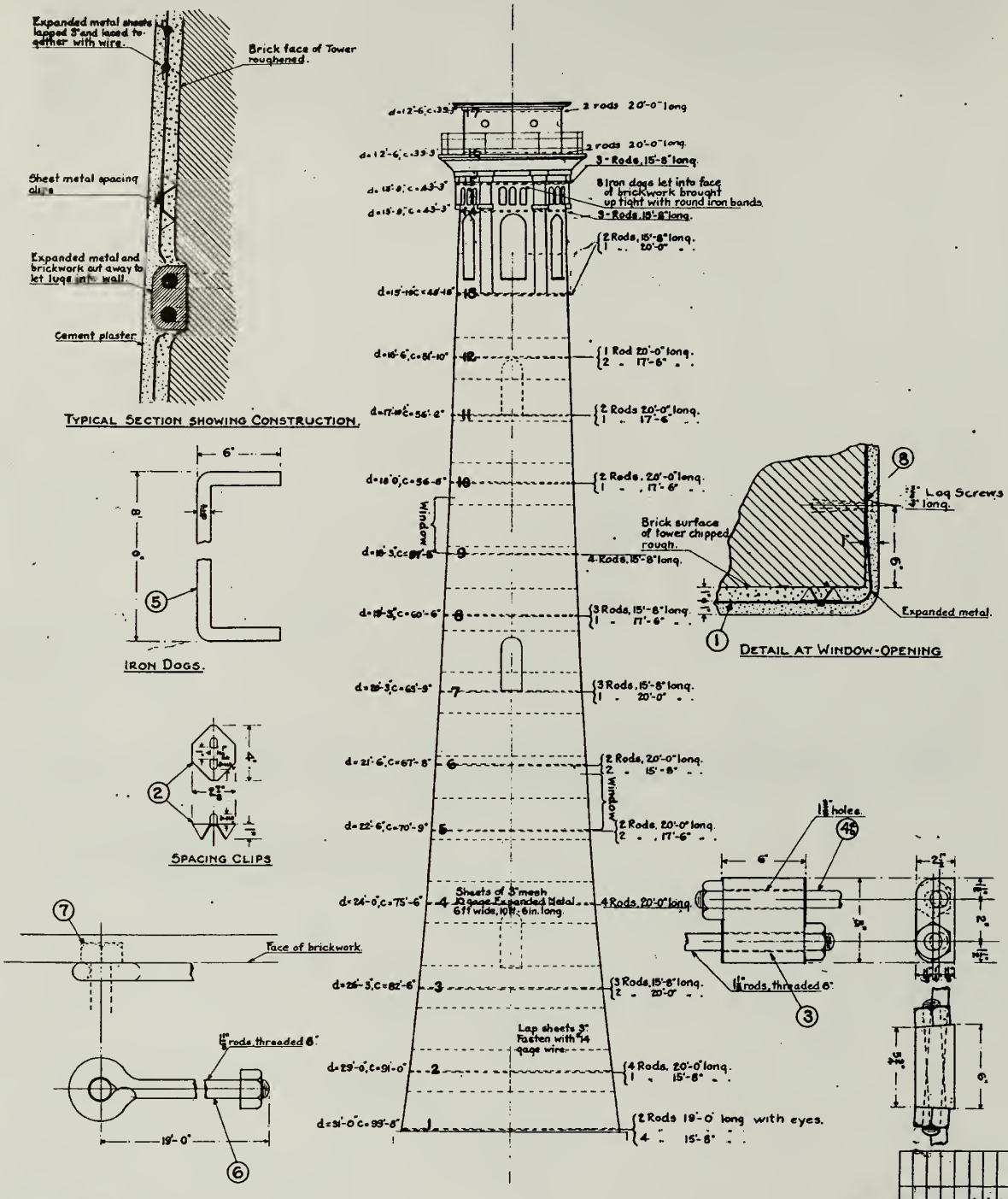
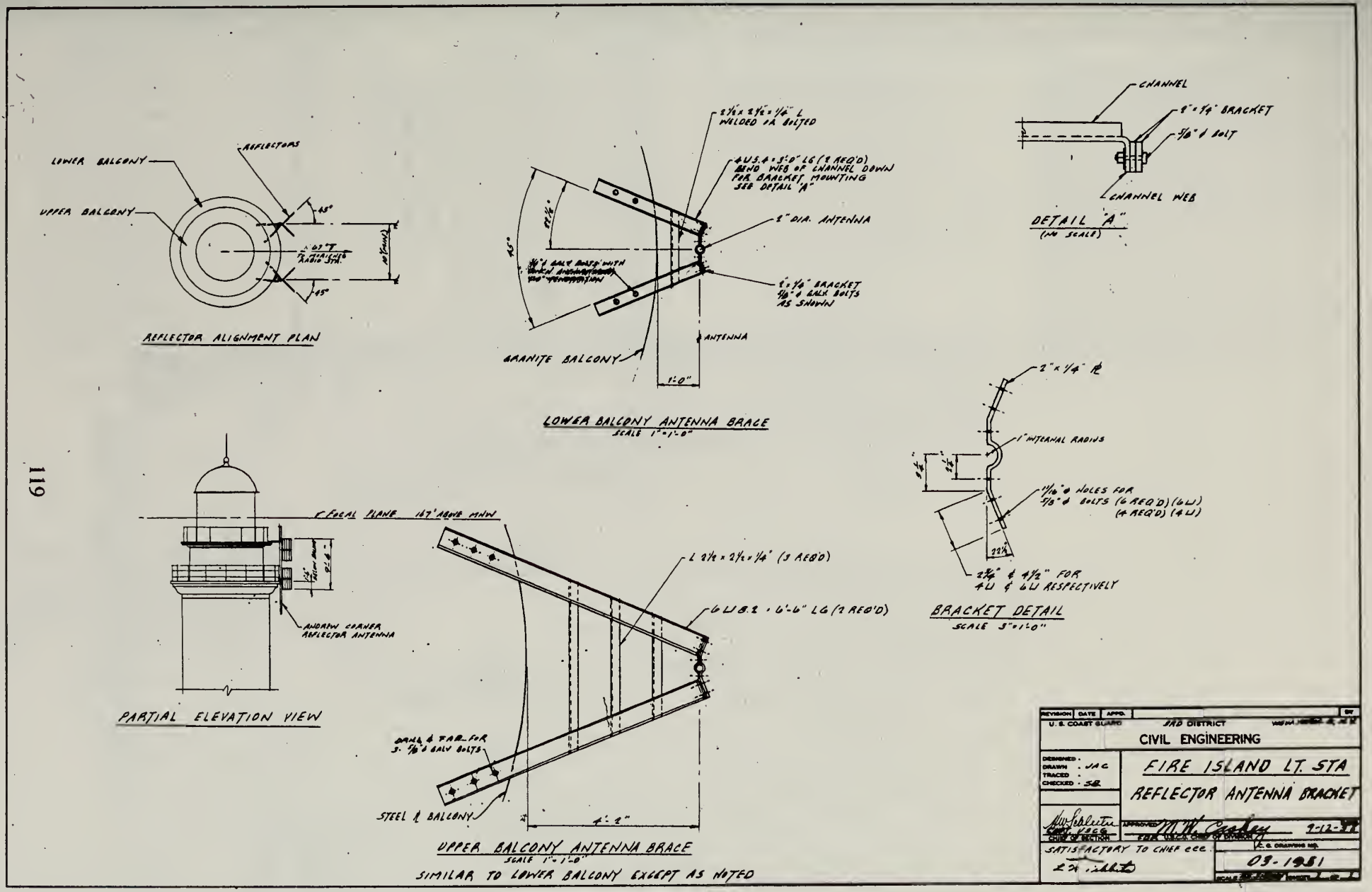


Figure 57. Tower: plan for protective coating (1912).



119

Figure 58. Tower: plan for reflector antenna brackets (1958).

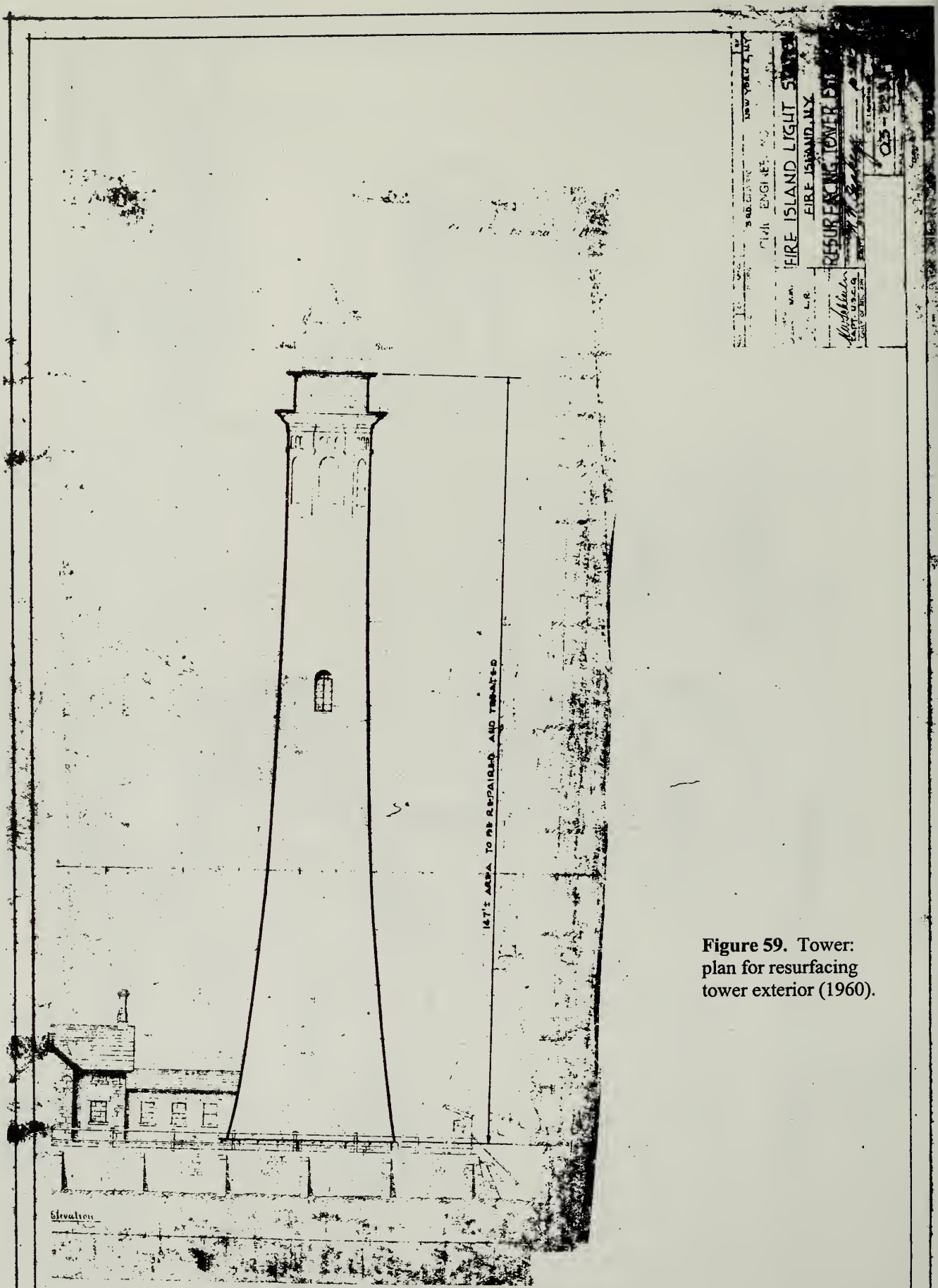


Figure 59. Tower: plan for resurfacing tower exterior (1960).

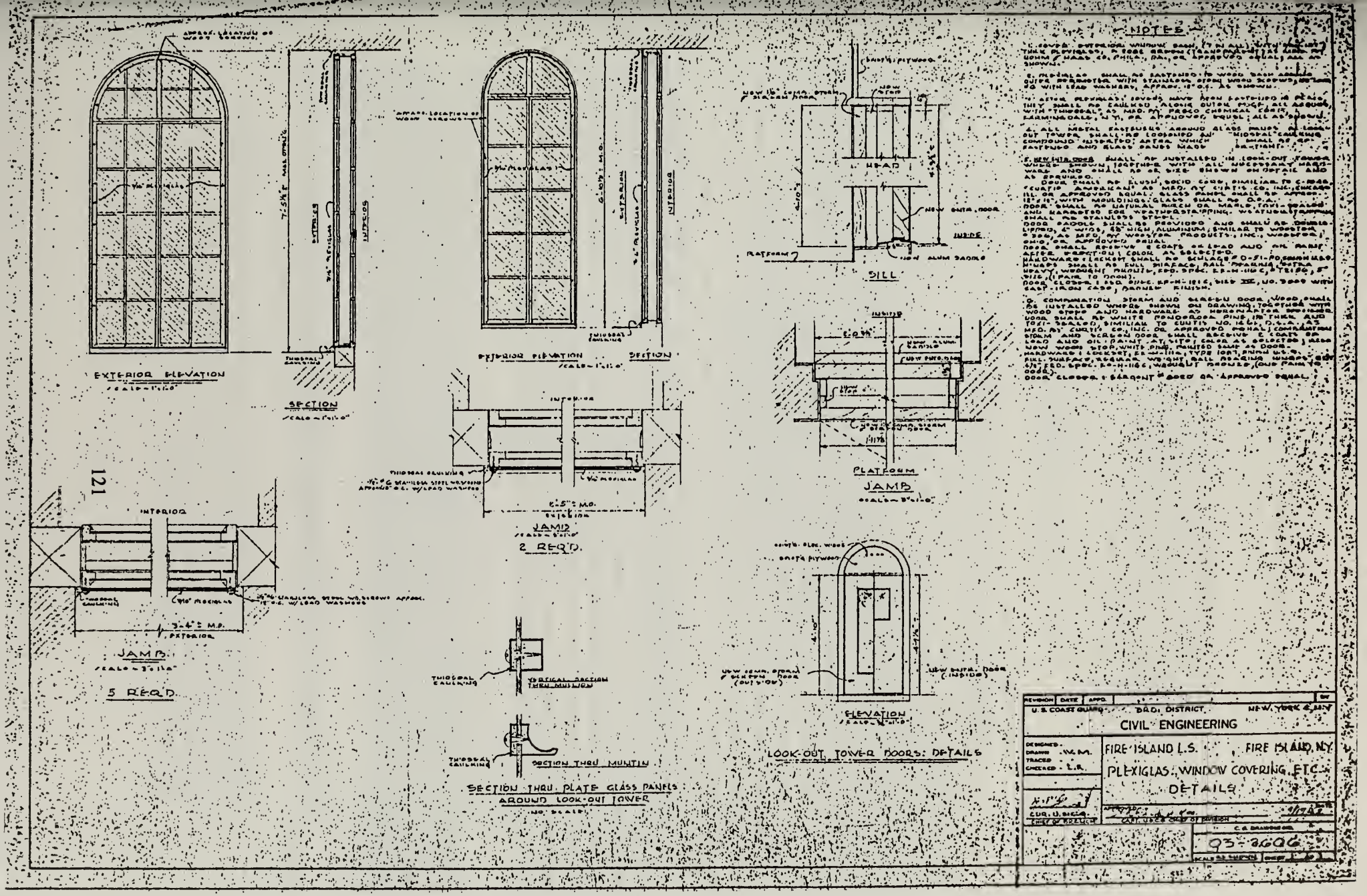


Figure 60. Tower: drawings for new Watch Room doors and plexiglass storm windows (1962).

LANTERN AND LANTERN FIXTURES

The prime source of documentary data on the physical history of the lantern is the monthly and annual reports of the Third District's inspectors and engineers. Pictorial sources are helpful only for the exterior of the lantern; no historic photographs were located of the lantern's interior. The following narrative is organized chronologically, describing the documented repairs and alterations to the lantern from construction to the present time.

Original Construction

Lt. Duane notified the Lighthouse Board on April 8, 1857 (App. C-5), that "the appropriation for rebuilding the Light House at Fire Island will be reduced by the purchase of a Lantern and illuminating apparatus to about $25,000...." The lantern was to be of the "first order," to house a first-order Fresnel lens. Most lanterns were constructed to standards promulgated by the Lighthouse Board, and the Fire Island lighthouse was no exception. It is assumed that specimen drawings existed, based upon a letter from the Lighthouse Board to Lt. Morton dated April 20, 1858 (App. C-47): "Drawings of a lantern very nearly like that of Fire Island will be sent to you when you require them." These drawings have not been located, but two such drawings do survive from 1871 (figs. 61-62). These were located in Volume 8 of the Lighthouse Portfolio of drawings at the National Archives, Plates 1-B and 2-B. The structural aspects are strikingly similar to those of the present Fire Island lantern. Therefore, it is thought that the 1871 drawings are updated versions of those drawings mentioned in 1858.

Figure 6, which is hypothesized to be an original construction drawing, shows the lantern with sashes that are three vertical lights high. The structure is covered with a domed metal roof with raised seams, which is topped by a ventilator ball and spire. The upper balcony projects beyond the exterior walls of the Watch Room, but not as far out as the lower balcony. It is partially supported by the corbeled brick dentil course that is the Watch Room's cornice molding. Noticeably absent from the drawing of the lantern structure are diagonal braces on its exterior. As mentioned in the section on the tower, the balconies' railings appear to have been constructed as drawn in figure 6.

Judging by the Lighthouse Board's letter of April 20, 1858, the Fire Island lantern as designed (fig. 6) and built (fig. 11) did vary slightly from the board's standard designs for that year. A comparison of figures 6 and 11 indicates that at least the exterior of the lantern was built as designed. Therefore, differences between the standard 1858/1871 drawings and the present Fire Island lantern are probably attributable to either Fire Island's deviations from the board's design, or later alterations.

The main differences between the standard design drawings and the present lantern are as follows:

- the sill rabbet and air register shown in no. 16 of figure 61 do not exist at Fire Island;
- the design for the ladder (fig. 61, nos. 18 and 20) is different;
- the design of the balconies' railing posts (fig. 62, no. 13) is different; and
- the apex of the lens shelter (fig. 61) is absent.

This author believes that the omission of the sill rabbet and air register details were original deviations, because these items would have had to have been built into the structure, and it would have been difficult to remove them. It is also thought that the current ladder is the original one, based on the lack of evidence that it has been changed. As mentioned, the two balconies' railings are known to have been changed around the turn of the 20th century. The lens shelter seen in the 1871 drawings is absent at Fire Island. It is likely that such a feature would have been required for a first-order lantern. Thus, the absence of a lens shelter is also thought to be an alteration.

Only several fragments of documentation exist regarding the actual manufacture and installation of the lantern. The lantern was manufactured in Chicopee, Massachusetts, at the Ames Company, as this excerpt from a July 23, 1857, letter (App. C-26) attests:

> The lantern for Fire Island (Ames) is at Chicopee, boxed & ready for transportation. Can you take it & have it stored either in New York or at Fire Id?

Lt. Morton wrote to James L. Ames on April 12, 1858 (App. C-43), requesting shipment of the lantern to the Third District office in New York, so that he might oversee transport of the lantern to Fire Island. The letter concludes with comment that the Ames Company "undertook to store the lantern at a moderate charge." By April 19, 1858, Lt. Morton had received the lantern, as indicated in his letter postscript to the Lighthouse Board (App. C-46), as follows:

> P.S. I have the Fire Isd. Lt. Apparatus in this city, from Chicopee.
> I send it today to Fire Island to save storage.

The Lighthouse Board informed Lt. Morton on April 20, 1858 (App. C-47), that "Drawings of a lantern very nearly like that of Fire Island will be sent to you when you require them." Presumably, this would have been to facilitate the installation of the lantern, since the lantern itself had been ready for almost a year.

Repairs and Alterations

1860's

Only two references to the lantern dating to the 1860's were located. The first was found in the annual report for 1862 (App. C-66). The report mentioned that the lantern needed curtains, and that an estimate had been obtained. The second reference to the lantern does not appear until May 5, 1865 (App. C-67), at which time the acting Third District engineer informed the Lighthouse Board of the following in a letter:

> I have also to report that the roof of the lantern leaks on the N.E. side and needs repairing and repainting.

1870's

The year 1871 appears to have been a significant year in the U.S. lighthouse system, in terms of lighthouse documentation and construction. In September of that year, a form was distributed by the Lighthouse Board "mainly to guide in preparing accurate descriptions of new light-stations, but [which] will be used also in describing those that have been long established, when required." This form was Number 36, entitled "Description of Light-house Tower, Buildings, and Premises." One was not filled out for Fire Island, however, until 1880 (App. C-86). In 1874, a storage closet was built in the lantern room (App. C-74). The next year, the roof of the lantern was patched; a new chimney cap was set up, and the stovepipes were adjusted and overhauled. The year 1877 saw rubber-coated cords fitted to the lantern's curtain rollers, as noted in the December monthly report (App. C-74).

1880's

The most extensive data on the lantern and its fixtures dating to the 1880's is found in Appendix C-86: Form No. 36, "Description of Light-House Tower, Buildings, and Premises" at Fire Island, compiled in March 1880. The survey appears to have been performed rather hastily, since some items were not accurately described. A summary of the information relating to the lantern and lantern fixtures is included below:

Order or class of lantern.	First Order
Diameter.	11 feet 4 inches interior
Number of sides in plan.	16
Height glazed.	9 feet 9 inches
Number of plates in height.	3
Number of plates in each side.	3
Thickness of plates.	three-eighths of an inch
Size of different plates.	Lower 27 5/8 inches by 30 ¾ inches
	Middle 27 5/8 inches by 39 inches
	Upper 27 5/8 inches by 26 ¾ inches

Number of storm-panes of glass. None
Materials of which lantern is constructed. Iron
Dome. Copper
Cowl. Copper
Lightning-conductor spindle. Copper, platinum point
Lightning-conductor, of what material; how attached to spindle, of what material, etc. Copper rod, outside of the Tower
Balustrade and outside gallery. Copper pipe railing - Iron gallery
Floor of lantern – of what materials. Copper inside, Cast Iron outside
Lantern-doors, and how fitted. Wood lined with copper
Watch-room door leading into the lantern, and how fitted. Trap door of wood lined with copper
Lantern-ladders for cleaning plate-glass outside. One of wrought iron
Curtain-hooks inside of lantern - how fitted. None
Watch-room how fitted. Wooden floor copper covered. Heater, and strainer. L.H. Clock

By 1881, the lantern was more than 20 years old and beginning to show its age. The annual report for that year (App. C-85) noted the roof as leaking. Between 1884 and 1886, a complete overhaul of the lantern was undertaken, as recorded in the monthly reports (App. C-85).

1884 - work for strengthening and better securing the lantern attended to [July]
1886 - lantern thoroughly overhauled and refitted with new screws [August]

Two historic photographs are thought to date from about 1886: figures 11 and 12. They offer a remarkably clear image of the lantern. The outline of the Fresnel lens is visible within the lantern's shell. The raised seams of the metal roof can be seen, as well as the underside of the projecting cornice of the roof. The lower balcony still features only two rails, and the upper has one. (Whether more rails are actually extant is not known, because the projecting cornices may be obscuring them.) Braces still are not visible on the lantern's exterior, nor is the gas pipe around the lantern's cornice. The opening of the upper balcony deck for the ladder is shown. The original Watch Room is illustrated in both photographs, as is the denticulated cornice and a vent in the Watch Room wall. The lantern's exterior finish, including balcony railings, appears to be the same as that of the tower's shaft–the uniform light color (yellow-cream).

During 1887 and 1888 the lantern underwent additional repairs, as described in the district engineer's and inspector's reports (App. C-85). Plate glass for lantern repairs was procured in May 1887. By June, the lantern was reglazed, and new screws were substituted for those worn out by rust. The glazing continued to be repaired into 1888, and the roof was put in good order. Also, a new lining for the lantern dome was received.

1890's

The 1891 sketch (fig. 16) that was prepared in conjunction with the change of the coloration shows the lantern's exterior as black; this treatment has remained throughout the 20th century. A year later, a new collar was fitted on the lantern's dome, to hold pipes (monthly report for July 1892, App. C-94).

Activity was generated around the lantern in 1894, when the Lighthouse Board proposed to change the lamp to a bivalve lightning lamp, with steam-generated electricity as the illuminant (App. C-94, 1894 annual report). During January 1894, a set of five drawings was prepared focusing on the lantern (figs. 63-67). Figures 63 through 65 (Plates 1, 2, and 3) are drawings of vertical sections (not including the roof structure) through the upper three rooms: the lantern, the Watch Room, and the Service Room. The remaining Plates 4 and 5 are floor plans–figure 66 of the Watch Room and figure 67 of the lantern. Figure 65 is particularly useful, because it provides dimensions. The dimensions have not been verified, however. The lantern and Watch Room floors are noted as being of iron, those of the Service Room are of wood. One rail is extant on the upper balcony, and two rails on the lower balcony. Eight exterior braces are illustrated as well.

It would be necessary to have an alternative light to use while the main light was being changed. Therefore, the board had a platform built on the lantern's balcony, and a temporary fourth-order lantern installed on it. Figure 66 depicts the layout of the temporary fourth-order lantern on the balcony, in addition to a vertical section through that lantern's platform. Figure 67 shows the floor plan of the first-order lens; the opening in the lantern's deck for the illuminating apparatus to penetrate is designed as being 6 feet 11 inches in diameter. The annual report for 1895 notes that the fourth-order lantern had been placed on a bracket on the south side of the tower. Figure 68 depicts

proposed changes to the Watch Room floor. However, the plan to introduce the bivalve lightning lamp was dropped in 1895, so none of these changes were carried out.

September 1896 saw more repairs to the lantern: 16 new bolts in the brace were installed, and the dome lining of the lantern was repaired (App. C-94). By December of the same year, the iron fourth-order lantern had been removed.

During the remaining years of the decade, lantern repairs revolved around the glazing (App. C-94), as follows:

1897 - nine plates of lantern glass were furnished [January];
1898 - six plates of lantern glass and four steel set screws for lens were furnished [October]; and
1899 - ten plates of lantern glass and four storm-pane clamps were furnished [January].

1900's

Plates of glass continued to be replaced into 1900. The monthly report for March 1900 (App. C-105) states: "Eight plates of Lantern glass (4) 27 $^{11}/_{16}$" x 38 $^{5}/_{8}$", (4) 27 $^{11}/_{16}$" x 39 $^{1}/_{8}$" and five pairs of knobs and three catches for doors furnished."

Figure 20, dating to August 12, 1900, offers a superb view of the southeast side of the lantern. The curtains are drawn in this figure, so the lens is not visible. The installation of the fourth-order lantern had required the alteration of the railing in front of the Watch Room doorway, on the south side of the tower. Apparent in this photograph is the change in railings. A timber still remains–supported on the lower balcony–apparently awaiting removal. The lantern braces are noticeable. The Watch Room's denticulated cornice and vents are visible, as is the Watch Room door, featuring three panes of glass. The collar for pipes can be seen encircling the lantern's cornice, although the railing's stanchions are not extended up and secured to the pipe.

In 1901, it was noted that storm panes and clamps were needed for the lantern (App. C-105). The curtain rollers were repaired in September 1903. Six plates of lantern glass were furnished in November 1903 (App. C-105).

Repairs to the copper roof and its lining were undertaken in 1905 (App. C-105). The annual report for that year described the following work:

- three sections of new lining in dome of lantern fitted;
- new smoke stack supplied; and
- copper roof of lantern repaired.

Ten more plates of lantern glass were furnished in 1906, according to the annual report (App. C-105).

1910's

In 1912, a bird guard was installed on the lantern (App. C-128), and 16 iron stanchions, or railing posts, were removed from the railing of the upper balcony (App. C-130). These were replaced with the present railing posts.

Two memorandums survive from 1918 (App. C-135) describing the repairs made to the lantern after lightning had struck the pinnacle on August 30. The keeper sent the following report to the Superintendent of Lighthouses:

> At 8:10 P.M. last eve. lightning struck the ball on roof of lantern, and punctured a hole through the seam about 1 inch long and ½ in. wide.
>
> It then went in the Watch Room and burned a small place on the column and followed down the call-bell wire to hall of dwelling and burned out telephone wire and demolished switch box connected with telephone.
>
> I filled in ball with red lead and painted over it this morning.

1920's - 1960's

For this time period, only scant historical data was uncovered that provided clues to the appearance of the lantern. Most photographs were not helpful. Two periods of work affected the lantern. These were the installation of new illuminating apparatus in 1932, and the installation of reflector antenna brackets in 1958 (see "The Light").

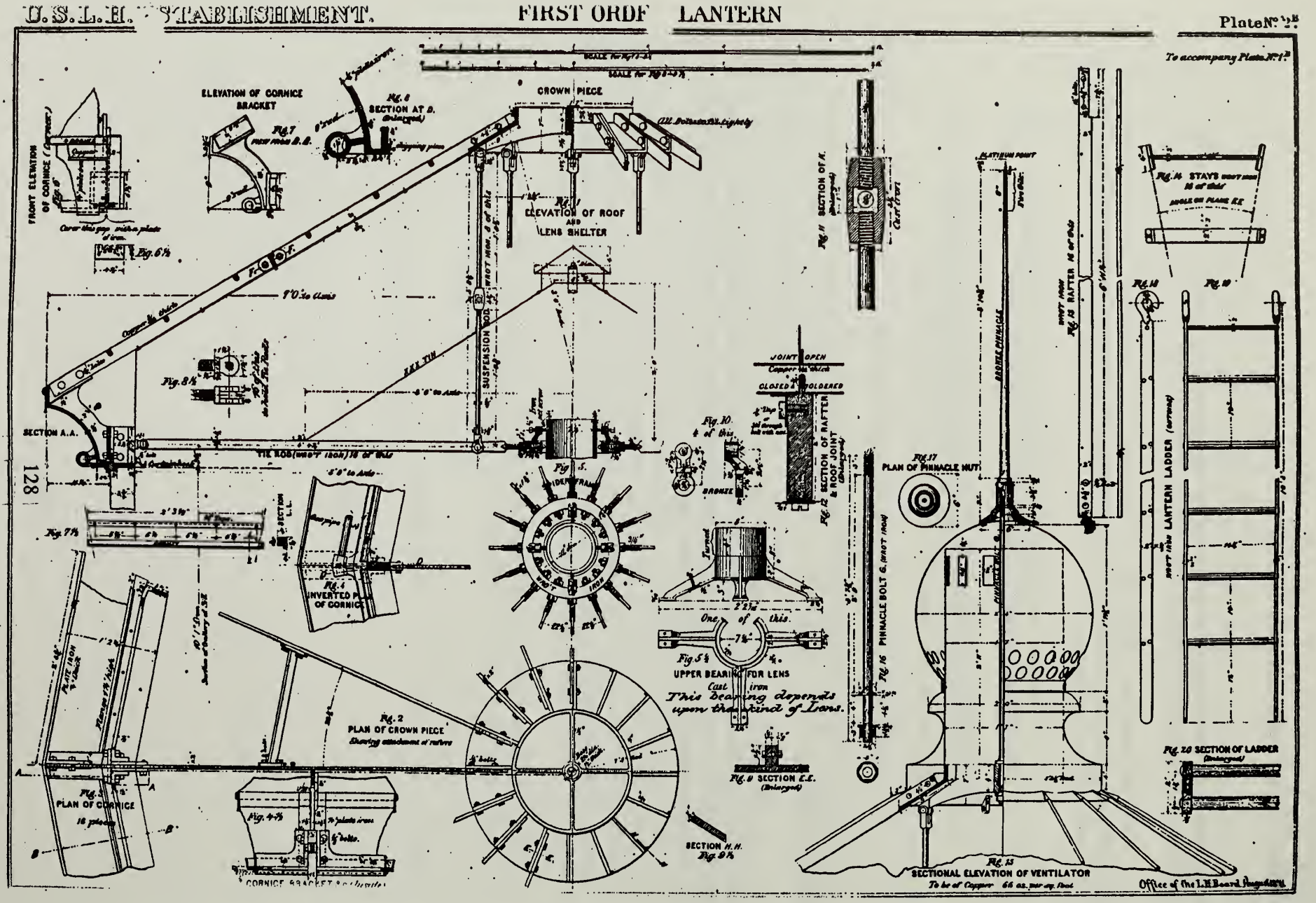


Figure 61. Details of a first-order lantern (1871).

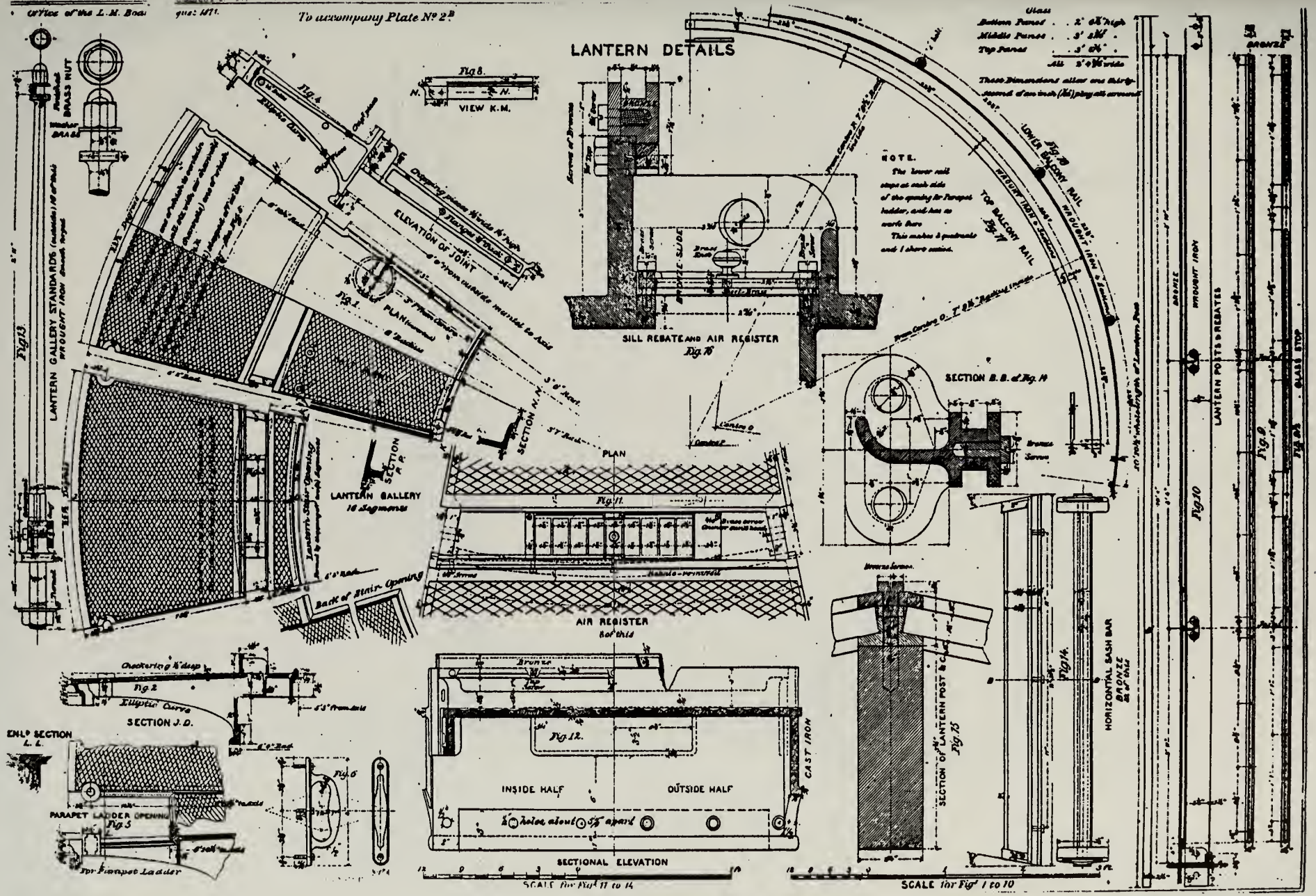


Figure 62. Details of a first-order lantern (1871).

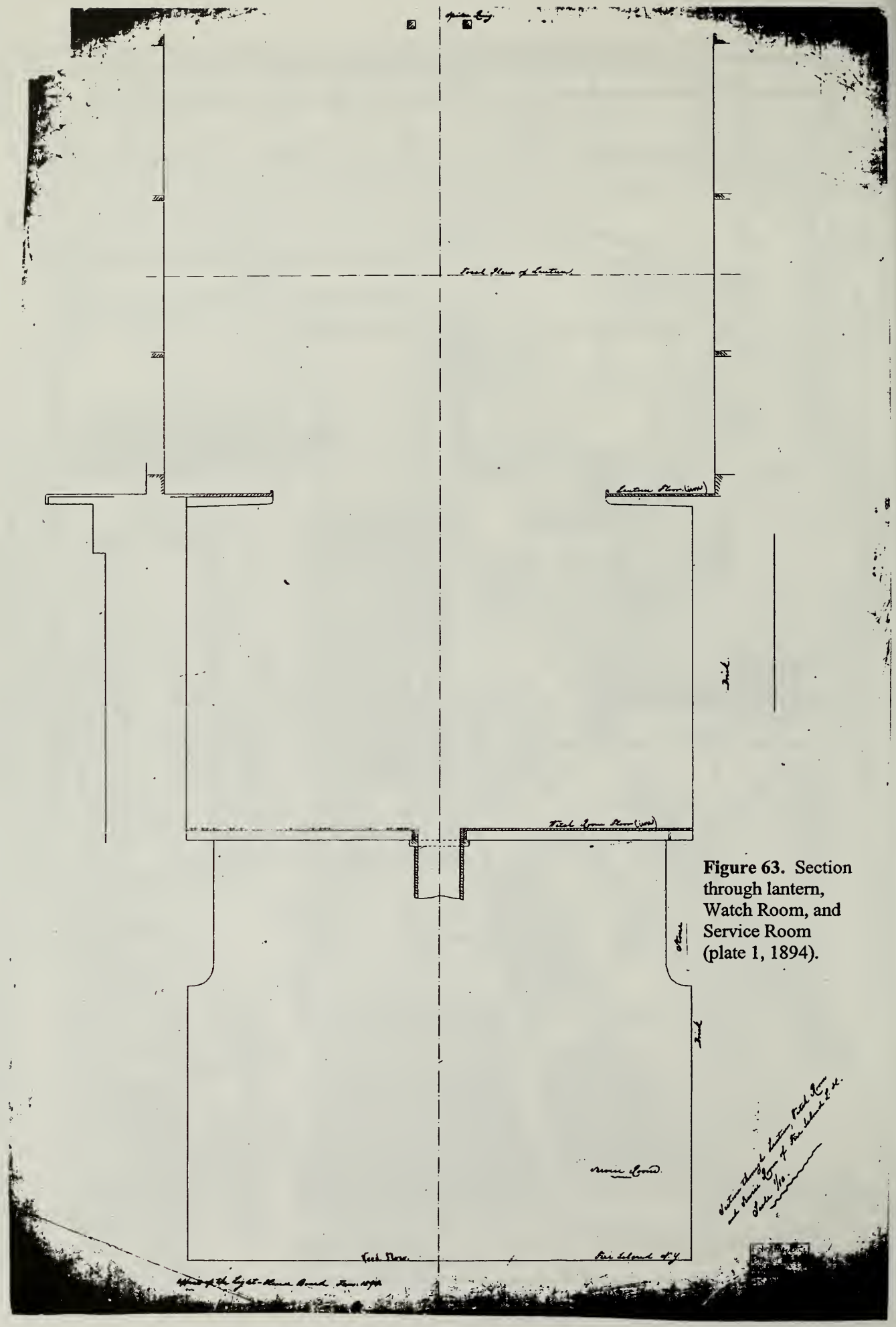


Figure 63. Section through lantern, Watch Room, and Service Room (plate 1, 1894).

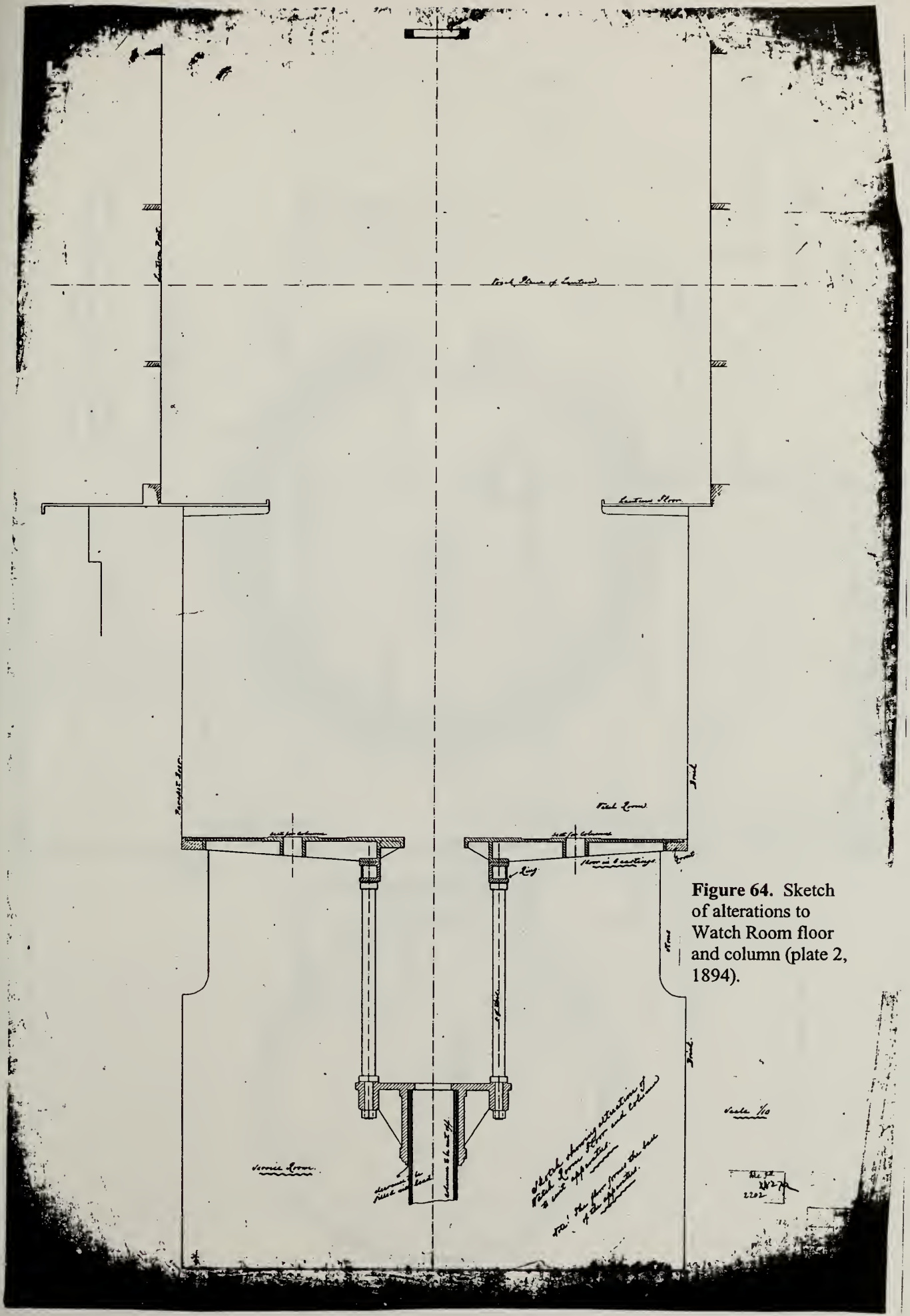


Figure 64. Sketch of alterations to Watch Room floor and column (plate 2, 1894).

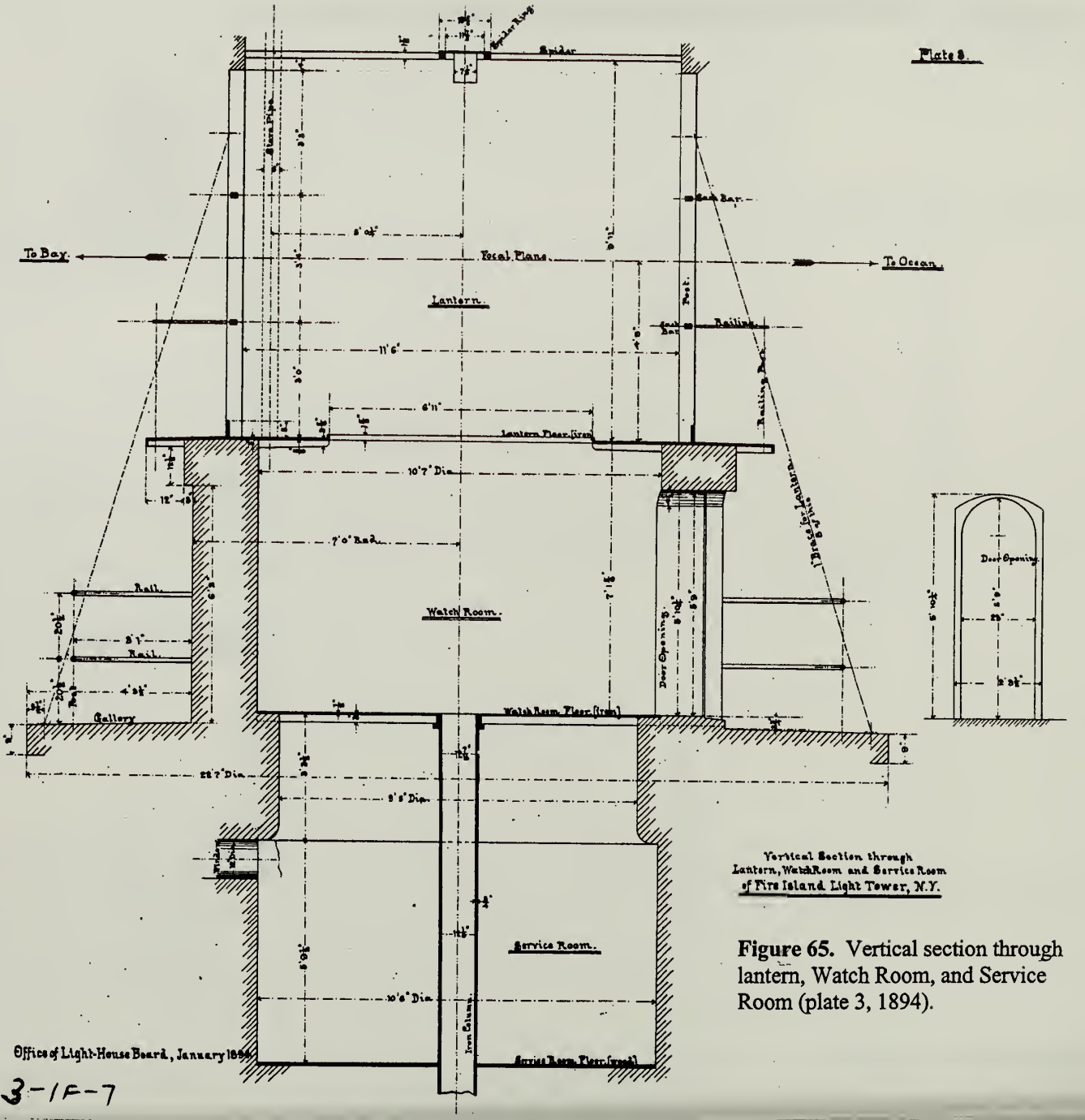


Figure 65. Vertical section through lantern, Watch Room, and Service Room (plate 3, 1894).

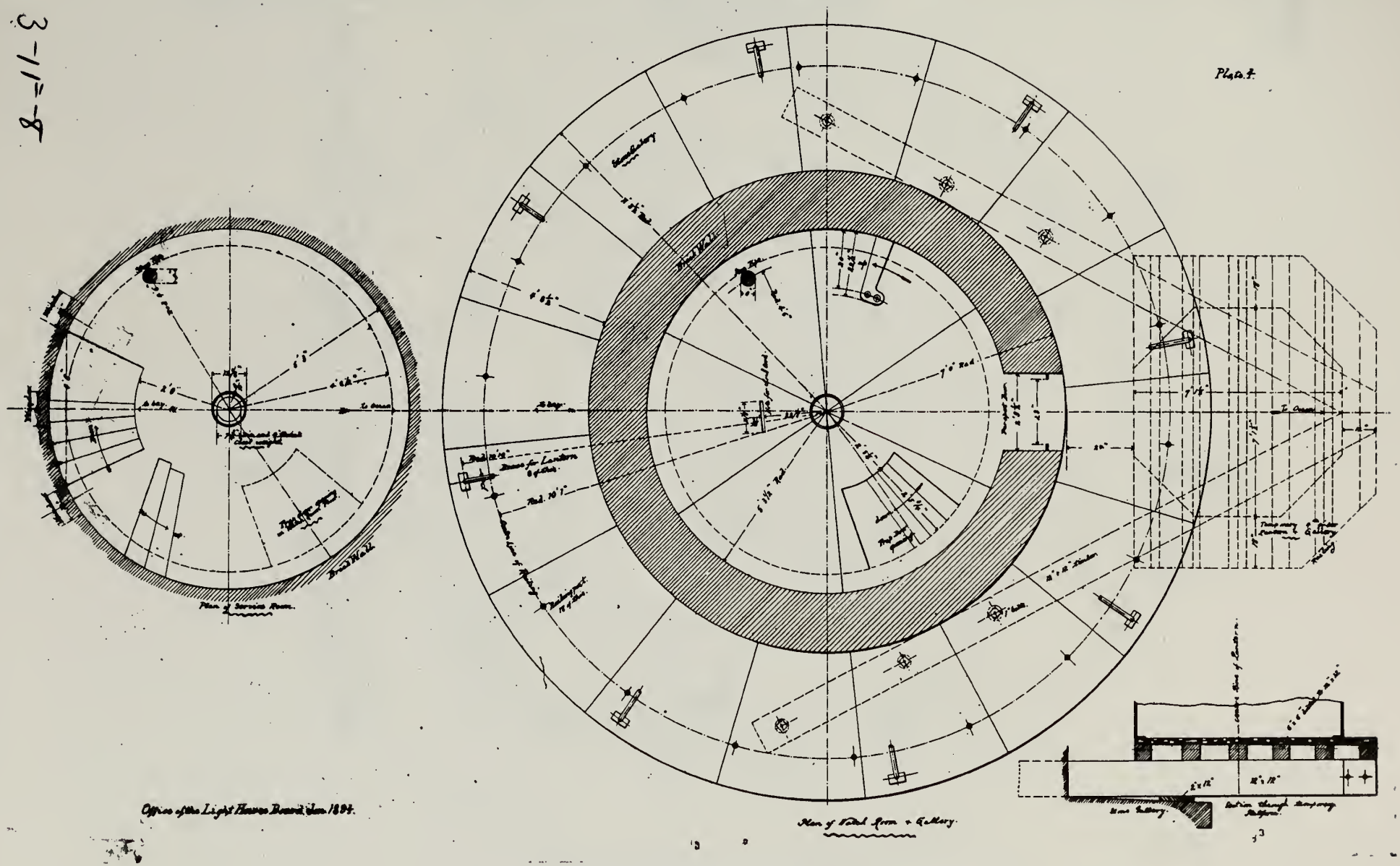


Figure 66. Plan of Watch Room and lower balcony (plate 4, 1894).

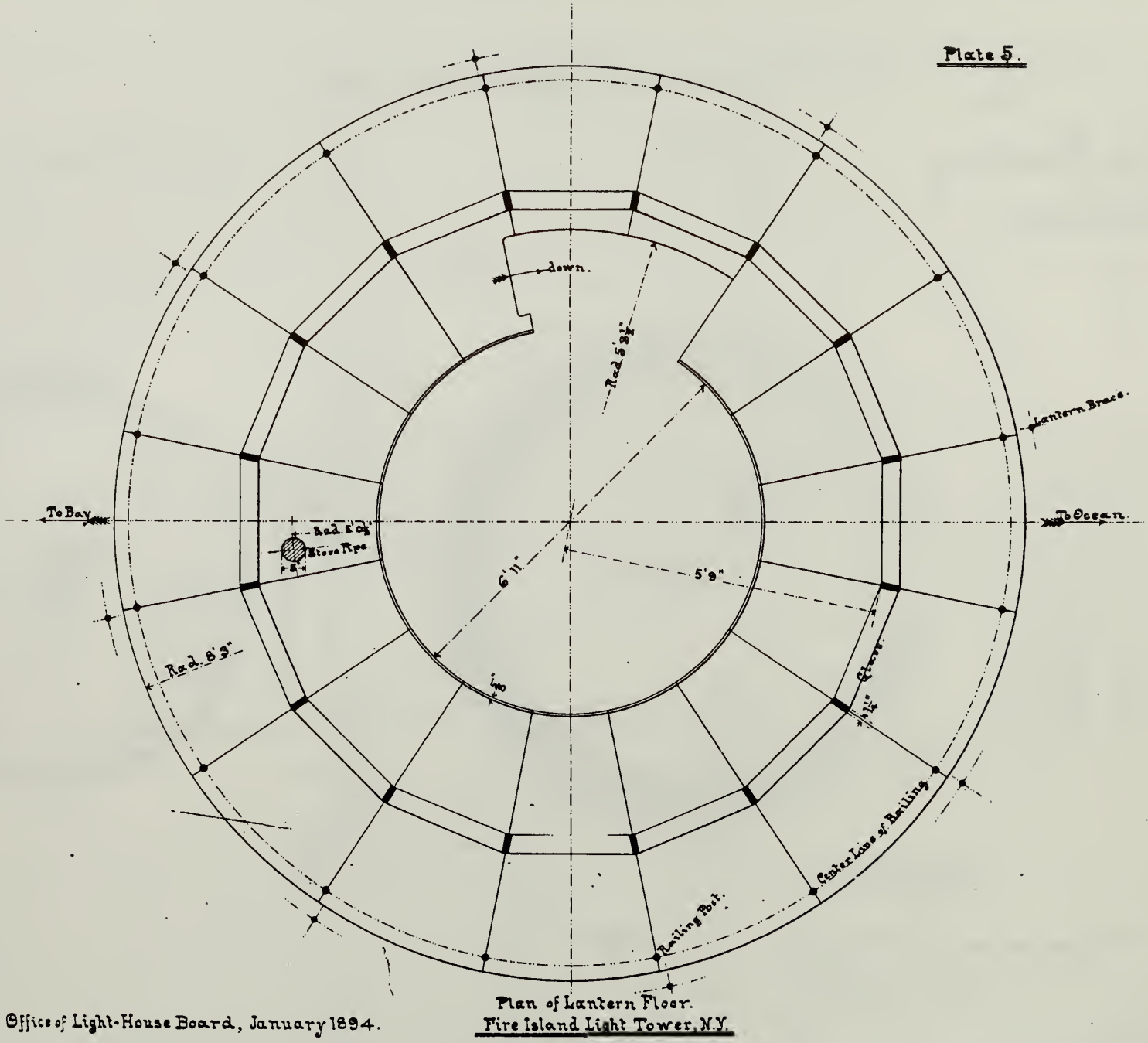


Figure 67. Plan of lantern floor (plate 5, 1894).

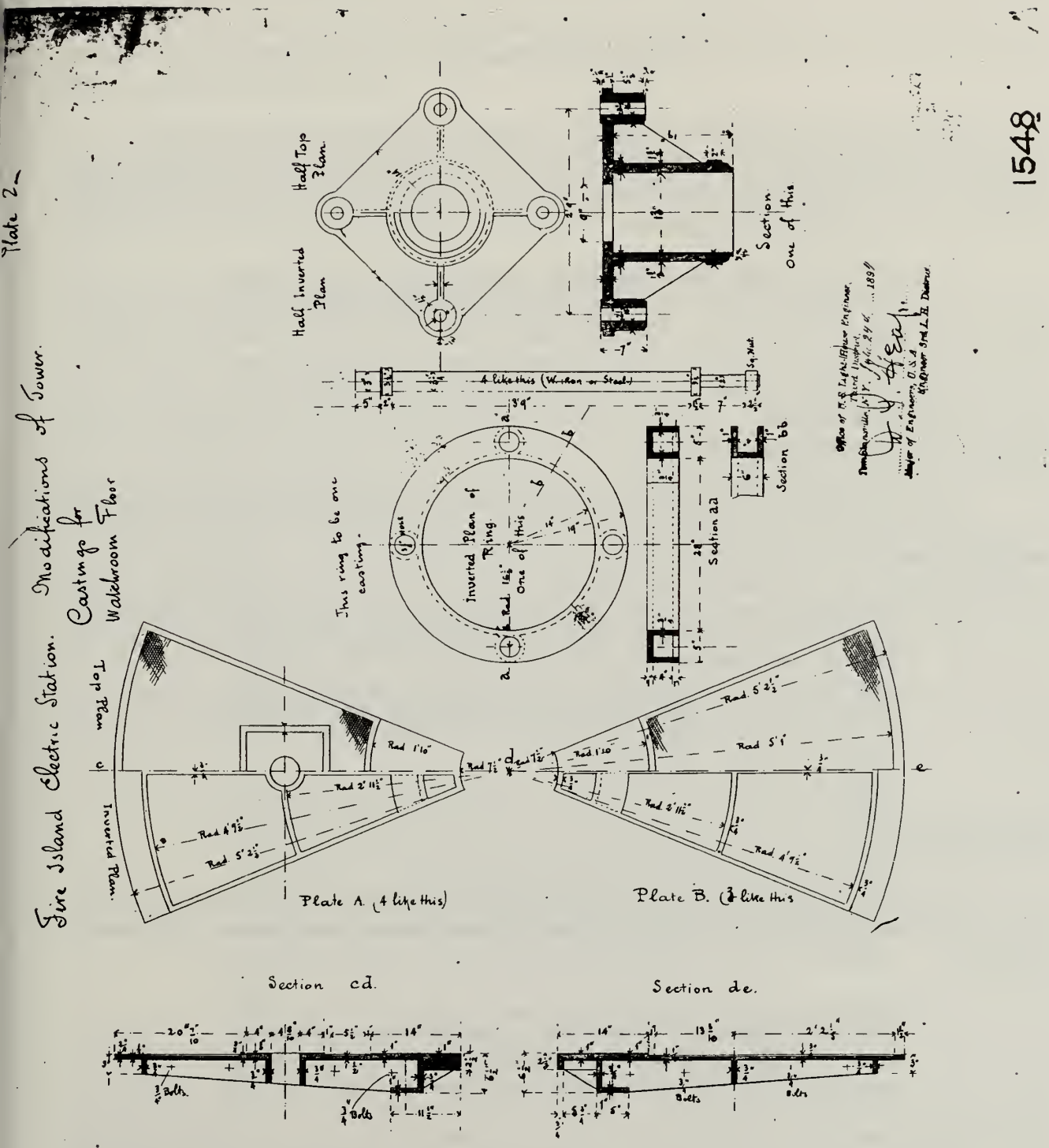


Figure 68. Details of Watch Room floor (1894).

THE LIGHT

Original Construction

The lighthouse and keeper's dwelling at Fire Island were constructed to serve "the Light," which was to be the prime aid to navigation in the area. Thus, it is ironic that the structures that existed for the "the Light" are the major focus of this historic structure report, and that "the Light" has taken on a role of secondary importance.

The story of the second Fire Island light actually begins with the Board of Specialists selected in 1851 to study the aids to navigation system in the United States. The board recognized that the lens system known as the Fresnel apparatus was far superior to the other forms of illumination then in use. In 1852, Congress–following the board's recommendations in reorganizing the United States Lighthouse Service–ordered the Fresnel-type of apparatus to be installed in all newly constructed lighthouses. The new Fire Island tower would be one of the lighthouses to reap the benefits of this Congressional initiative.

The annual report of the Lighthouse Board for the year ending June 30, 1857 (App. C-1), describes the role that the new first-order apparatus at Fire Island was to play in guiding navigation along the seacoast:

> Upon completion of the first class tower at Fire Island, now under construction, and which it is expected will be finished early next season, there will be three first class light-houses fitted with first-order lens apparatus, properly distinguished, on the seacoast of Long Island from Montauk Point to the entrance to New York, a distance of about 120 miles, which will render the navigation along that coast with ordinary care and precaution, entirely "easy and safe."

The Fresnel Lens

The Fresnel lens was designed by French physicist Augustin Fresnel in the early 19th century. The principal behind the system is succinctly described in the book *America's Lighthouses* as follows:

> Prisms at the top and bottom refracted, or bent, the light so that it came from the lens in a narrow sheet. At the same time, the light was intensified at the center of the lens by a powerful magnifying glass. The result of this refraction and magnification was a bright, narrow sheet of concentrated light emitting from the lighthouse.[1]

The Fresnel lens featured one lamp with a variable number of concentric wicks, depending upon the order of the light. The type of lamp was determined by the means of supplying fuel to the wicks.

---

[1] Francis Ross Holland, Jr., *America's Lighthouses* (Brattleboro, VT: The Stephen Greene Press, 1972), p. 18.

The Fire Island Fresnel Lens

The Fire Island Fresnel lens dates to the construction of the second Fire Island lighthouse in 1858; it served the lighthouse until 1933. In June 1933, the lens was removed and transferred to the Franklin Institute of Philadelphia.

The Fresnel lens at Fire Island consisted of a first-order revolving apparatus. To house this lens, a first-order lantern was required. The cost of these items was a topic of concern in the early correspondence. Commander Thornton A. Jenkins, secretary of the Lighthouse Board, wrote to Third District engineer Lt. J.C. Duane on March 24, 1857 (App. C-3), as follows:

> This 1st/order revolving apparatus for the proposed tower may be set down in round figures at $10,000.-, leaving $30,000.- for the tower which should not be less than 150 feet -- focal plane, above mean low water.
>
> I have to request your early attention to this subject in consideration of the importance of a 1st/order light at that point.

A second letter dated April 8, 1857 (App. C-5), describes the appropriation for rebuilding the lighthouse at Fire Island reduced by the purchase of a lantern and illuminating apparatus to about $25,000. The original appropriation for the lighthouse was $40,000.

Correspondence was exchanged between the Lighthouse Board's secretary and the Third District engineer during March and April 1858, regarding the inventory of the 35 boxes containing the Fire Island illuminating apparatus (Apps. C-38 and C-45). The specifics of the inventory were not included in the correspondence, however.

By July the Notice to Mariners was being prepared, identifying the new light at Fire Island. The notice was issued on July 3, 1858 (App. C-54), as follows:

> On the evening of Monday, the 1st day of November next, a first order revolving light will be exhibited for the first time, and on every night thereafter from sunset to sunrise, from the lighthouse tower now in course of erection at Fire Island Beach, east side of Fire Island inlet, south side of Long Island, N.Y. The illuminating apparatus is of the first order revolving catadioptric of the system of Fresnel, and will produce a brilliant flash once in every minute, which will not be materially different in appearance from the existing light in the old tower at that place, except in the greater brightness of the flash and increased range of new light.
>
> The new light should be seen in ordinary states of the atmosphere, from the deck of a vessel 15 feet above the water, from 21 to 23 nautical miles.

Lt. James St. C. Morton replaced Lt. Duane as Third District engineer in 1858. His September 30, 1858, report to the Lighthouse Board (App. C-61) identifies the tower as being "fitted with illuminating apparatus of the 1st. order revolving catadioptric of the system of Fresnel which produces a brilliant flash (of white light) once a minute. The weights belonging to the clock work descend inside of the central iron column." In a letter dated November 4, 1858 (App. C-62), Lt. Morton informed the Lighthouse Board: "I intend to leave for Fire Island this afternoon: The Light was duly exhibited on the 1st inst. and burned excellently...." He states further that he hopes "to

carry to Washington a photograph of the Establishment in a week or so." If he indeed transported a photograph, its present whereabouts is not known.

The Lamp

It is not entirely clear in the correspondence as to what type of lamp was first installed with the Fresnel lens. Apparently, French Moderator lamps were destined for Fire Island, but whether they were actually introduced is not certain. Lt. Morton had some reservations about the use of the French Moderator lamp, as he expressed in correspondence to the Lighthouse Board dated May 27, 1858 (App. C-52). He believed that the moderator lamps were "subject to a chance of irregularity, in the possibly defective workmanship of the cylinders and plungers," and thought that "they are not adapted for burning the quality of oil used in the U.S. lighthouses." Morton conducted experiments in his office, comparing a first-order hydraulic lamp with the French Moderator lamp, finding the former a great improvement over the latter.

Lt. Morton informed the board in a July 12, 1858, letter (App. C-55) that "the two moderator lamps, originally destined for Fire Island, are now packed, and ready for shipment to Portland for the improvements you proposed in the cylinder and plunger." The remainder of the letter generates confusion as to whether or not the moderator lamps ever found their way to Fire Island.

A July 14, 1858, letter from the secretary of the board to the engineer (App. C-56) refers to the Fire Island lamps without stating the exact type of lamp. It is noted that "the pistons of the first order lamps for Fire Island Lt. House are I think improperly constructed - I wish to have them improved by the introduction of a valve, and some other alterations which I can have made at Portland by a person who has altered others."

Fuel

The original fuel is assumed to have been whale oil–the standard fuel employed throughout the service until ca. 1867, when it was replaced by lard oil.

Repairs and Alterations

The Lard-Oil Lamp

The first recorded significant changes to the illuminating apparatus occurred in the latter half of the 1860's. By 1887, lard oil had replaced whale oil as the illuminant in the major U.S. lighthouses. Exactly when the Fire Island lighthouse's fuel was changed is not known. It *may* have occurred as early as 1867. More likely it was not until 1869, when the illuminating apparatus was overhauled and adjusted. A Funck lamp replaced the mechanical lamp at the time (App. C-1).

Minor repairs were characteristic of the next decade. In 1875 measurements were made for repairs of the revolving machinery of the lens (App. C-74). An English wick was introduced during the same year (Apps. C-78 and C-79). The flashing machinery of the lens had new chariot rollers fitted to it, and the apparatus was repaired and put in good running order, according to the monthly report for June 1876 (App. C-74). A year later the bell springs, lamp reservoirs, and dampers were

repaired (App. C-74). A report of injury to the lens was submitted by engineer J.C. Woodruff on August 27, 1877 (App. C-81). The damage was repaired quickly (App. C-82).

The Mineral-Oil Lamp

The 1880's saw several modifications made to the Funck lamp. In 1882, it received new burners (App. C-85). They worked well, but used an excessive amount of lard oil. The Third District inspector prepared a report to the Lighthouse Board (App. C-87) identifying the problem. It was decided to modify the Funck lamp to burn mineral oil, or kerosene, instead. The mineral-oil lamp was installed and lighted for the first time on July 8, 1884 (Apps. C-85 and C-88).

The Bivalve Lightning Light

An increased amount of activity was generated at the Fire Island Light Station in the 1890's, with a proposed change in the lens at Fire Island. The annual report of the Lighthouse Board for 1894 (App. C-1) outlined the project as follows:

> Fire Island, New York. This is the most important light for transatlantic steamers bound for New York. It is generally the first one they make and from which they lay their course. It is a first-order light, flashing white at intervals of one minute. The illuminant is an oil lamp of 500-candlepower, and the intensity of the flash equals 63,830 candles. Mr. Henry Lepaute, of Paris, France, a manufacturer of lens apparatus for light-houses, exhibited at the World's Columbian Exhibition, held in Chicago in 1893, what is known as a bivalve lightning light, with electricity as an illuminant. It is called bivalve because it consists of two powerful range lenses, 9 feet in diameter, back to back, and is named a lightning light on account of the brilliancy and short duration of the flash. The arc light used is of very high candle power, and the makers claim that the intensity of the flash will be proportionately greater. The apparatus is so arranged as to give a flash every five seconds. The duration of the flash is about one-tenth of a second. The Light-House Board concluded to purchase this apparatus and install it in Fire Island light tower in place of the present lens. This necessitated in addition a steam and electric-light plant and a boiler and engine house to contain them. The steam and electric-light plant has been delivered by the makers at the Staten Island general depot. The boiler and engine house is now being built. During the change the light will be shown temporarily from a fourth-order lens.

Appendix C-101, dated May 7, 1894, includes a report by the Committee on Lighting, which recommends "that proper measures be taken to have the bivalve lightning lens in question installed at the Fire Island light-station, and that electricity be used as the illuminant, with steam as a motive power."

A letter dated May 17, 1894 (App. C-102), from the Captain, Corps of Engineers, to the Secretary of the Treasury sets forth the proposal to "substitute an electric light for the one now in use at this station." The letter continues with:

> the electric lighting of Fire Island is in the nature of an experiment. This light, when established, will be the only one of its kind in the United States,

> and it is of great importance that, on account of imperfect machinery, risk of failure be avoided. To this end, the best and not the cheapest appliances should be purchased, and the engines, boilers, dynamos and electric fittings should be obtained from firms who are positively known to be reliable, and from whom similar articles have been purchased in the past, and have given satisfaction.

Action was immediately undertaken to prepare for the change. The annual report for the year ending June 30, 1894 (App. C-94), stated "The work for the proposed change of the characteristic of the light is well advanced. The material for the electric building has been mostly collected at this Depot. The plant contracted for the fourth-order Lantern to be used while the change is being made is nearly finished." Figure 69 is thought to be a drawing of the lens intended for installation.

By the end of the next fiscal year–June 30, 1895–the following preparations, needed to establish the new electric light proposed for the station, were complete (App. C-94):

- a powerhouse and coal shed were built;
- two boilers, one engine, one dynamo, and one exciter were put in place;
- a narrow-gauge railroad was built from the beach to the coal shed;
- all the ironwork necessary to adapt the lantern to the new apparatus was fitted and stored at the depot, ready for shipment; and
- a fourth-order lantern was temporarily placed on a bracket on the south side of the tower, to serve until the new light was established.

However, the electric power plant was never put into operation, and the bivalve lightning light was not introduced at Fire Island. The reason for this was the decision to establish a lightship position nine miles seaward, which made the electrification of Fire Island unnecessary. The lightship did not go out until July 20, 1896, but the work on the Fire Island bivalve lightning light must have stopped as soon as the decision was made to establish the lightship. The monthly report for October 1895 (App. C-94) noted that the "tools, rigging &c, left at the Station when work on the electric plant, &c was suspended, have been brought to this depot." The annual report for the year ending June 30, 1896 (App. C-94), indicated that a decision had not been made as of that time about the disposition of the electric power plant. By December of the same year, the entire steam-and-electric plant, and the fourth-order iron lantern, were removed and brought to the depot. The "Journals of the Light-House Board" for May 3, 1897 (App. C-103), offered a suggestion by the chairman "that the proper measures be taken to place it [electric illuminating apparatus] where it would do the most good."

Overhauling the Fresnel Lens

The Fresnel lens was overhauled in 1896-1897 (App. C-94). A new governor, brass bushings for the clockwork of the lens, one drill, and one top were furnished. The clock was repaired, and the lens was leveled. Two damper pipes were overhauled, as well. This work was reported in the monthly report for September 1896.

The Fresnel lens received additional attention in 1897 (App. C-94). The revolving machinery of the lens was overhauled, and necessary measurements were taken for supplying new parts. A new chariot for the lens was furnished and fitted, as noted in the monthly report for January 1898. In

October of the same year, four steel set screws for the lens were furnished, and in December, two first-order damper rods for lamps were installed.

Repairs in 1899 (App. C-94) included the following: one steel bolt for the lens pedestal was furnished; a new clock for the revolving lens was made and fitted; and 12 balls for the bearing of the lens chariot wheels were furnished.

During the early years of the 20th century, the illuminating apparatus seemed to be undergoing continuous repair and replacement of parts (App. C-105), as follows:

1900 - the revolving machinery for the lens was overhauled (May), and the plunger valve of the lamp required repairs (November).

1901 - one burner and float chamber for the first-order lamp was repaired, and two new ratchet pawls were made and furnished.

1902 - two oil carriers and one first-order burner were repaired.

1903 - one first-order lamp was repaired; two ratchet pawls for the lens were furnished.

1906 - two new dampers and rods for first-order lamps were furnished.

The Vapor Lamp

The most radical change to the Fresnel lens in the early 20th century occurred in 1907, when its lamp was changed. A new vapor lamp was installed and placed in operation on December 3. The duration of the flash was reduced to 4 seconds, and the dark interval increased to 56 seconds. The fuel was changed from oil to incandescent oil vapor.

This action was followed in 1908 by a campaign to increase the intensity of the Fire Island light (Apps. C-112, C-113, and C-114). A letter dated February 11, 1908, identifies and compares the candlepower of the old and new lights at the Fire Island Light Station. One specific petition was submitted by a group of steamship companies and marine-insurance companies (App. C-114). This petition stated:

> That it is of the greatest importance to the safety, and the uninterrupted course, of navigation that the light on Fire Island should be of a character equal to that of the best lights in existence elsewhere;
>
> That the present light on Fire Island has not been changed for many years, is not a modern light, and is not of such power as should be provided for a light in this important position.

In response to this public pressure, the Third District's inspector and engineer prepared several reports. These are included in Appendix C-114. The Lighthouse Board also became involved, making the following statement in its annual report for 1908:

> Fire Island light is the objective point of all vessels approaching New York Harbor from the eastward after making Nantucket Shoals light-vessel, and it is of the greatest importance to navigation that this light should be of a

> character equal to that of the best lights in existence elsewhere. It is estimated that this station can be equipped with modern high power illuminating apparatus at a cost of $30,000 and the Board recommends that an appropriation of that amount be made therefor.

However, for some reason, these recommendations were not implemented.

Removal of the Fresnel Lens

According to records in the National Park Service's possession, it was not until 1929 that serious discussion was turned again to the intensity of the Fire Island light (App. C-139). The result was a "Recommendation as to Aids to Navigation" (Form 80) issued by the Office of the Superintendent of Lighthouses (App. C-145). This Form 80 noted that "the present apparatus [the Fresnel lens] is of obsolete type and is beyond economical repair; it has been giving trouble for several years and has now reached the point where replacement is necessary." The proposed action was to "replace the present lens and apparatus with a more efficient lens and apparatus and change the period of light from Fl. W. 60 sec. to Fl. W. 7 ½ sec. and the characteristic of light from flash 5 sec., eclipse 55 sec. to flash 0.27 sec., eclipse 7.23 sec., with no change in candlepower."

The most economic and advantageous method for achieving this end was described as follows:

> It is proposed to transfer the lens and mercury float apparatus from the discontinued Shinnecock Bay Light Station to Fire Island Light Station after modifying the lens and apparatus from two groups 3-45° flash panels and two 45° blank panels to 4 single 45° flash panels and four 45° blank panels spaced alternately 90° on centers. Character and period of light: Fl. W. 7 ½ sec., flash 0.27 sec. eclipse 7.23 sec., lens to make one revolution in 30 seconds. It is also proposed to fit up and use a 4th order lens and apparatus with 55 mm. I.O.V. lamp in lantern at this station while the change in apparatus is being made, light to have the same character and period as at present, Fl. W. 60 sec., light 3 seconds, eclipse 57 seconds. The mirror which formed a part of the Shinnecock Bay Light equipment cannot be used at Fire Island, therefore there will be no change in candlepower for Fire Island Light.

Drawings accompanied this proposed changed. Three drawings were prepared in 1932, showing a first-order lens, a new revolving apparatus, and a pedestal (figs. 70-72). A fourth drawing (fig. 73) was made of the temporary lens installation that would serve while the main lens was being changed.

In June 1933, the Fire Island Fresnel lens and its old clockworks were transferred from the Lighthouse Service to the Franklin Institute of Philadelphia, Pennsylvania. The lens is currently exhibited in a lobby of the Franklin Institute Science Museum (figs. 74-75). Its catalogue description (Catalogue No. 2573) is as follows:

> Taken from the Fire Island lighthouse on the south shore of Long Island and is the first light seen by incoming Transatlantic liners bound for New York. This lens in this flasher is a Fresnel of the first order and was operated on a cycle of 5 sec. flash, 55 sec. eclipse. The light inside of this lens was an incandescent oil-vapor lamp, operated by pressure supply to the burner. The

light of 280,000 candlepower was located 167 feet above high water and was visible for 19 miles. Was in service from 1858 to 1932.

The Electric Incandescent Lamp

On June 7, 1938, a "Recommendation as to Aids to Navigation" was prepared, proposing that the Fire Island light be changed from an incandescent oil-vapor lamp to an electric incandescent lamp (App. C-149). Commercial electricity was now available at the station. The recommendation included the following commentary:

> The present I.O.V. lamp to be replaced with electric lamp, 1,000 w. T-20 bulb, clear, 2-C-5 filament, mogul base.
>
> Characteristic flash every 7.5 second, 0.25 second flash, 7.25 seconds eclipse.
>
> Clock for revolving lens to be replaced with an electric drive. Present Wright operated clock and I.O.V. lamp to be used as reserve in case of failure of electricity.
>
> Installation of electric light combined with discontinuance of most of buoy attendance by Keepers with establishment of buoy service base for buoys on south side of Long Island will eliminate one Keeper.

In other words, both the light and the mechanism that made it revolve were electrified. Figures 76-78 show the electric-motor drive designed for the light, while figure 79 depicts a lamp stand also installed at that time.

The data regarding the lamp type and flash length included in the recommendation, as stated above, generated much discussion. The nature of the problems will not be presented here, since they are treated in Appendix C-149. One aspect of the controversy revolved around whether to employ a frosted or a clear lamp. After testing, it was decided to maintain a clear lamp (a 1,000-watt, T-20 bulb with a 1,100,000 candlepower.)

The Automated Lamp

Apparently another lamp was installed in 1951. No data was located on the specifics of this lamp, but it is still extant. An undated newspaper article found in the Fire Island National Seashore library includes the following statement: "Before we got this new light in 1951...a man had to climb up here at morning and night to cover and uncover the light."

Relocation of the Light

A memorandum dated February 11, 1974 (App. C-154), summarizes the next significant phase in the Fire Island light's history: the relocation, modernization, and automation of the light. Excerpted from the memorandum is the following synopsis:

> The project to relocate Fire Island Light from the deteriorating brick structure built in 1858 was initiated in 1966. Civil Engineering estimated at that time that $120,000 would be required for permanent repairs to the tower. The decision to relocate the light was made, and records indicate that initial plans were to construct a 70-foot tower with a DCB-36 searchlight optic installed under reference (a). In 1967, a proposal was advanced to relocate the light to the top of a water tower which was under construction at that time by the Long Island Park Commission. The Commandant authorized the design of a small flash tube optic which could easily be installed in the tower. This unique optic was recently installed and made operational on 1 January 1974.

The illuminating apparatus remaining in the lighthouse tower today thus reflects the 1932 period and later alterations.

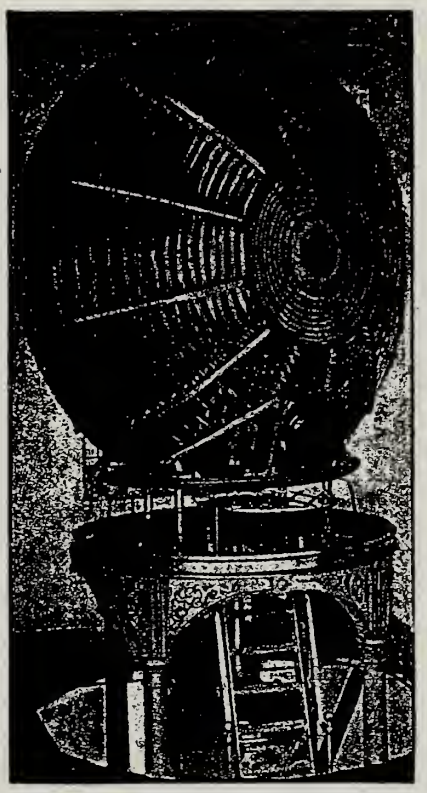


FIG. 122.—FIRE ISLAND LIGHTHOUSE LENS.

Figure 69. Lighting apparatus: Fire Island Lighthouse lens, 1896.

VERTICAL SECTION THRU LENS & PEDESTAL.

Figure 70. Lighting apparatus: section and plan of first-order lens, revolving apparatus, and pedestal (sheet 1 of 3, 1932).

BILL OF MATERIALS

Drawing No.	Part No.	No. Req'd	Name	Material	Pattern No.	Remarks
7833	1	1	PEDESTAL SECTION	CAST IRON	1016-1	
"	2	1	" "	"	"	
"	3	1	" "	"	1016-1	
"	4	1	" "	"	1016-1	
"	5	1	" "	"	1016-1	
"	6	1	BASE RING	"	1016-2	
"	7	6	TAPERED WEDGE	STEEL		
"	8	68	⅝"-11 TAP BOLTS x 1¼" LG.			HEX. HDS
"	9	12	⅝" PITCH BOLTS, HEX. HD & NUT			LENGTH TO SUIT JOB
"	10	2	DOOR. 14⅛" x 22½"	AS SHOWN		COMPLETE.
"	11	2	" 10⅜" x 22½"	BRASS		"
"	12	4	HINGE. #16 GA.	"	1016-2	
"	13	28	CTSK HD MCH SCREW ⅜"-36 TPI			⅜" LG. HEX. NUT.
"	14	28	" " " "			⅜" LG.
"	15	1	SHAFT BRACKET	CAST BRASS	998-1	FOR BRACKET #15.
"	16	4	HEX. HD. TAP BOLT ⅝"-11 x 1¼" LG.	BRASS		
"	17	1	WASHER, ¼" THICK.	"		FOR BRACKET #15.
"	18	1	UPPER SHAFT-BRACKET	STEEL		TO DRIVING GEAR.
"	19	1	LOWER " " CLOCK	"		TO BRACKET
"	20	1	UPPER COUPLIN	BRASS		POP PARTS 18 & 19.
"	21	1	LOWER "	"		CLOCK TO PART 19.
"	22	2	PINS - ⅜"D x 1" LG.	STEEL		FOR PARTS 20 & 21.
"	23	2	" - ⅜"D x 1" LG.	"		" " " ⅝" "
"	24	1	EXTENSION SLEEVE	BRASS		FOR LAMP SHAFT.
"	25	1	FLANGE	"		" BASE PLATE.
"	26	4	CTSK HD MCH SCREW #10-32	"		⅜" LG. FOR PART 25.
"	27	2	FLAT HD SET SCREW ⅜"-16 LG	STEEL		FOR PART 24.
5845	36i	1	DRIVEN GEAR. 65 TEETH	BRASS.		MODIFIED TO SUIT.
"	358	1	DRIVING " 28 TEETH	STEEL		
"	344	1	" " HUB	"		
"	164	1	LOCK NUT	"		FOR PART 358.
"	306	4	CTSK HD MCH SCREW #14-20	BRASS		½" LG " 358
"	312	2	BALL BEARING. 40.12.17 MM BORE.			FOR BRACKET #15
"	379	2	COVER PLATE.	BRASS.		" " " "
"	130	4	#2-56 CTSK HD MCH SCREW	"		¼" LG " " "
"	28	1	55MM OIL VAPOR LAMP			TYPE "A"
"	29	1	1ST ORDER CLOCK			TYPE "D"
	30	4	#18-20 MCH SCREW x ⅜" LG.	BRASS.		FOR PART #29.
	31	1	1ST ORDER FLASHING LENS			REMODELED.

OFFICE OF THE SUPERINTENDENT OF LIGHTHOUSES.
THIRD DISTRICT. STATEN ISLAND, N. Y.

FIRE ISLAND LIGHT STATION.
1ST ORDER LENS, REVOLVING APPARATAS AND PEDESTAL
SCALE - 1"=1'-0" & 1½"=1'-0"

APPROVED: Aug. 20 1932
SUPERINTENDENT

O. B. Ruttkay
ASSOC. L.H. ENGINEER
DRAWN: C.R.A.
TRACED: C.R.A.
CHECKED:

SHEET 1 OF 3

7833

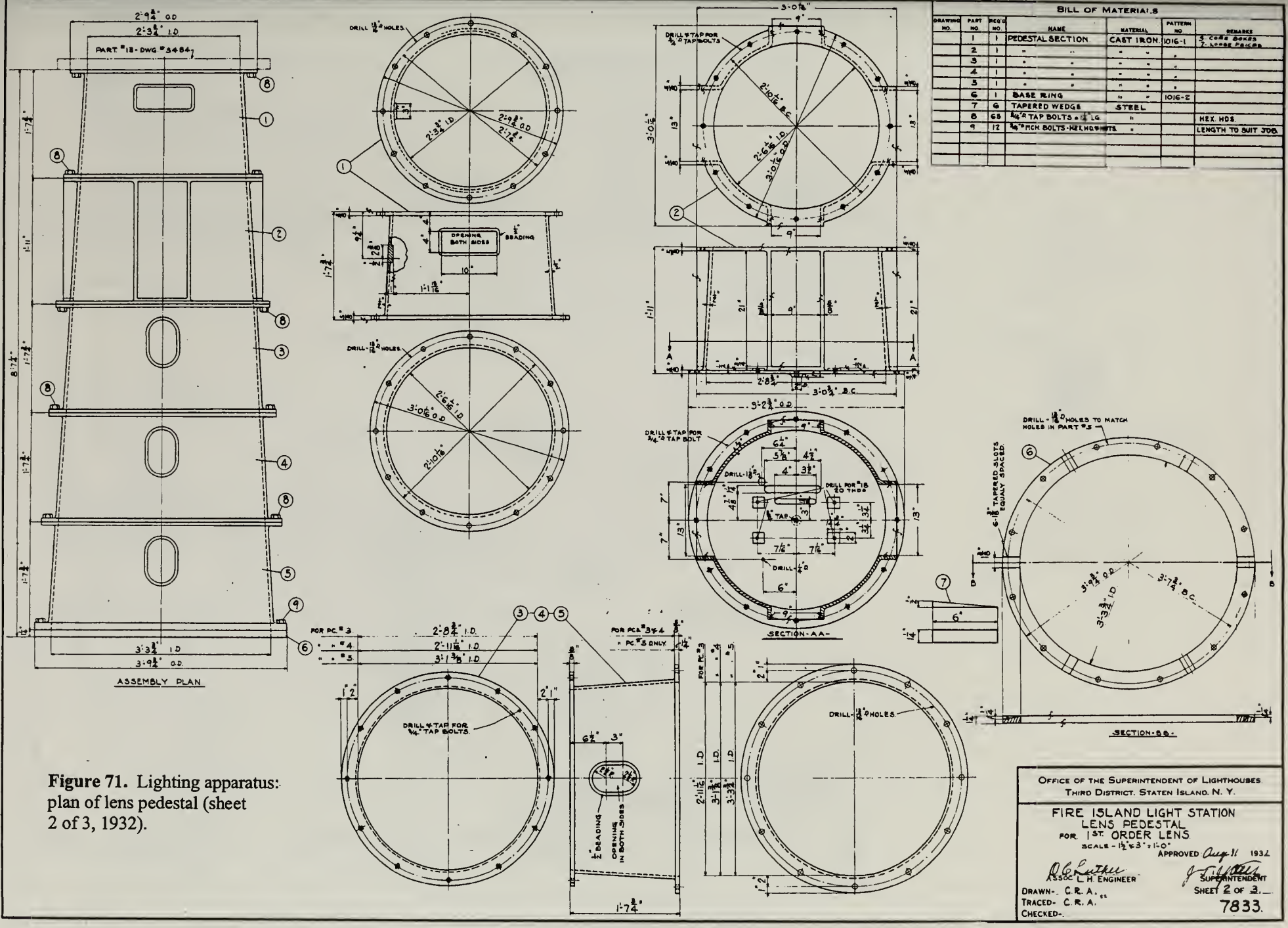


Figure 71. Lighting apparatus: plan of lens pedestal (sheet 2 of 3, 1932).

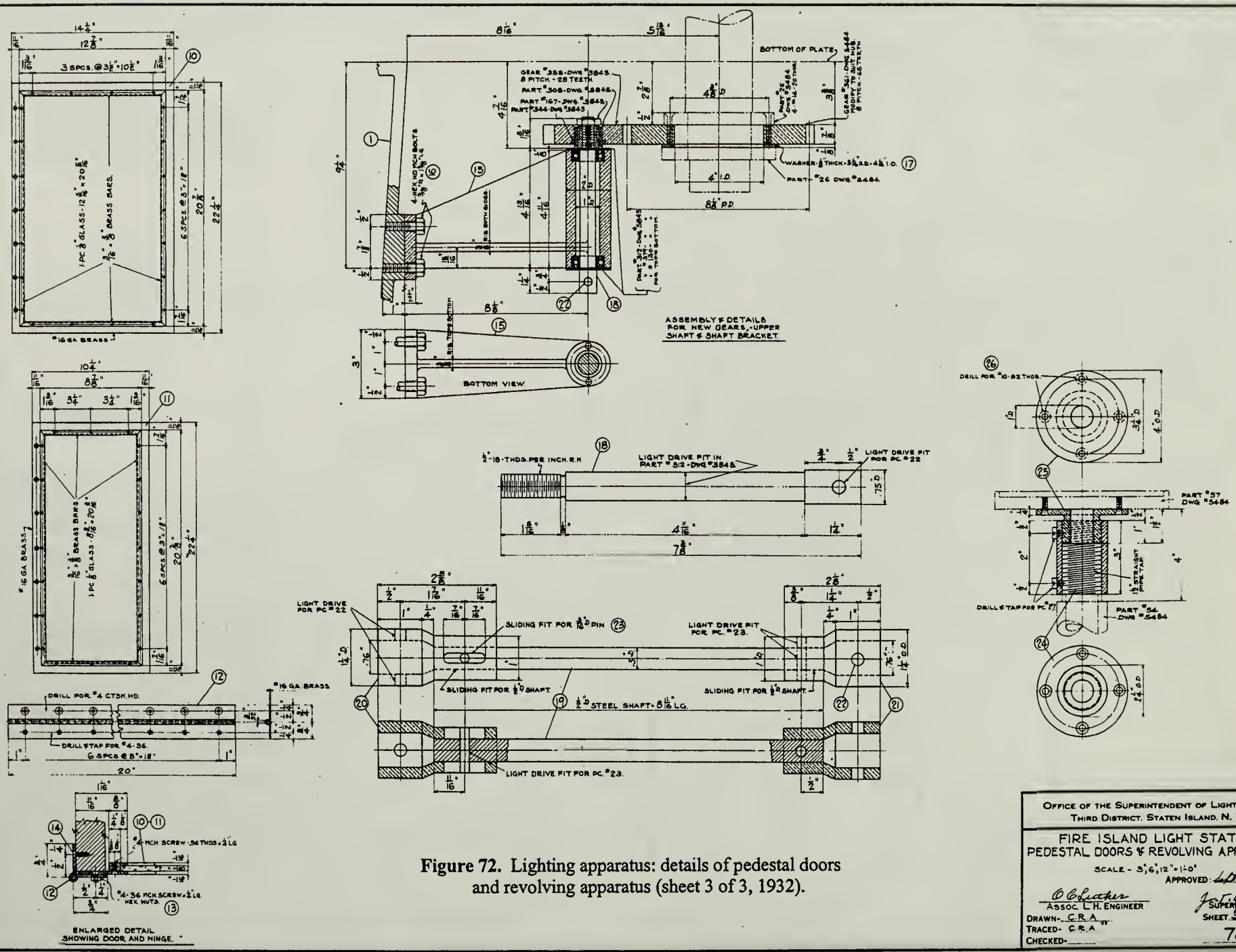


Figure 72. Lighting apparatus: details of pedestal doors and revolving apparatus (sheet 3 of 3, 1932).

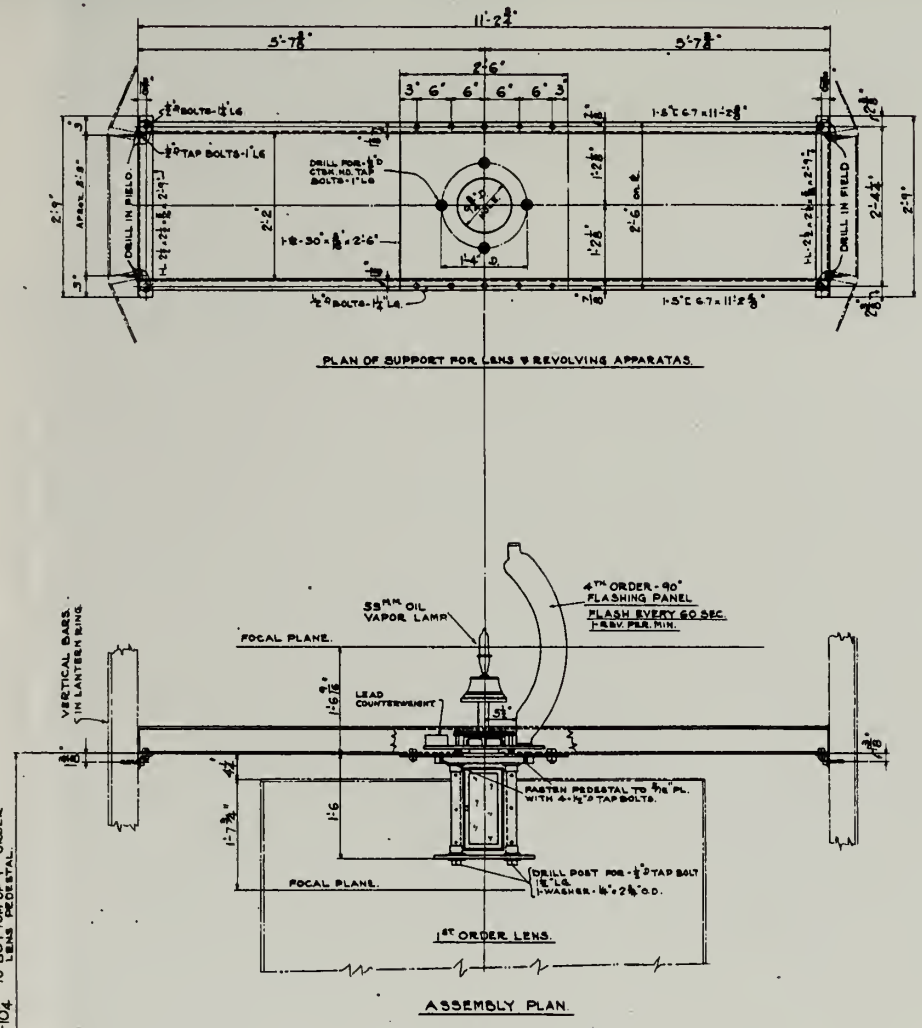


Figure 73. Lighting apparatus: plan of temporary lens installation (1932).

OFFICE OF THE SUPERINTENDENT OF LIGHTHOUSES
THIRD DISTRICT, STATEN ISLAND, N. Y.

FIRE ISLAND LIGHT STATION
TEMPORARY LENS INSTALLATION

SCALE - 1"=1'-0"
APPROVED: Sept. 20, 1932.

O. C. Ruther
ASS'T. C. H. ENGINEER

J. T. Ward
SUPERINTENDENT

DRAWN - C.R.A.
TRACED - C.R.A.
CHECKED -

SHEET 1 OF 1

7840

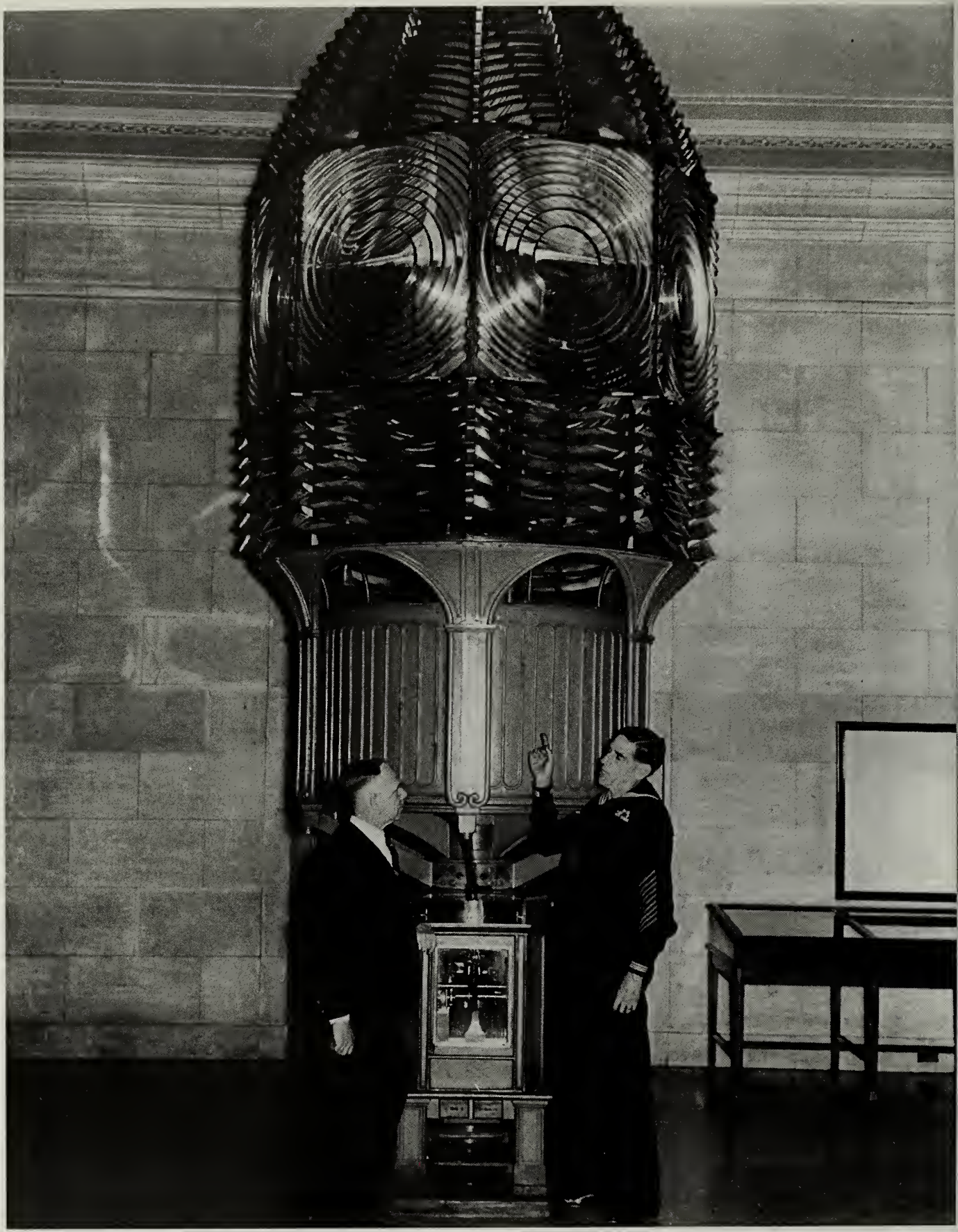


Figure 74. Lighting apparatus: Fire Island Fresnel lens (after 1932).

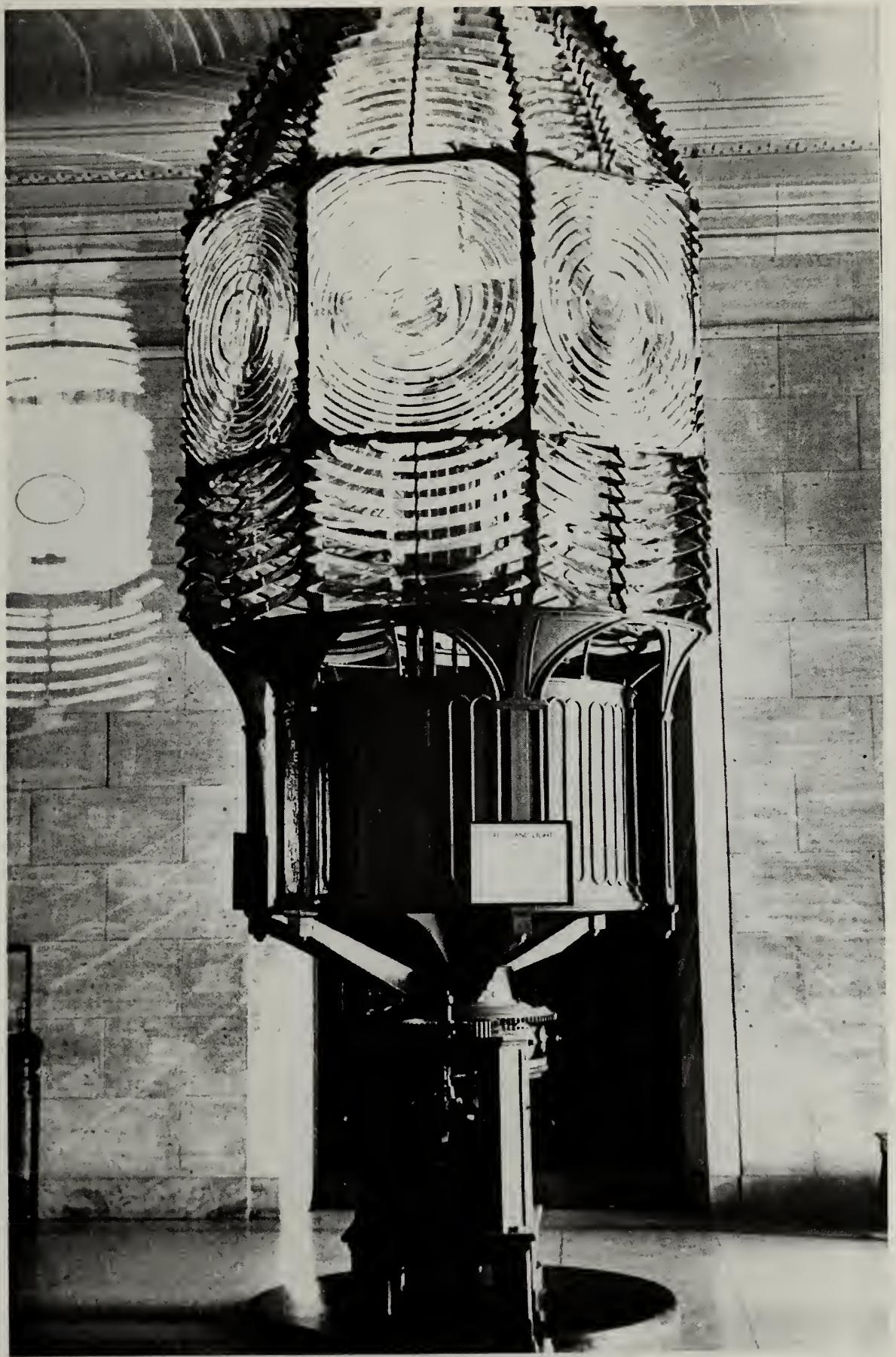


Figure 75. Lighting apparatus: Fire Island Fresnel lens (after 1932).

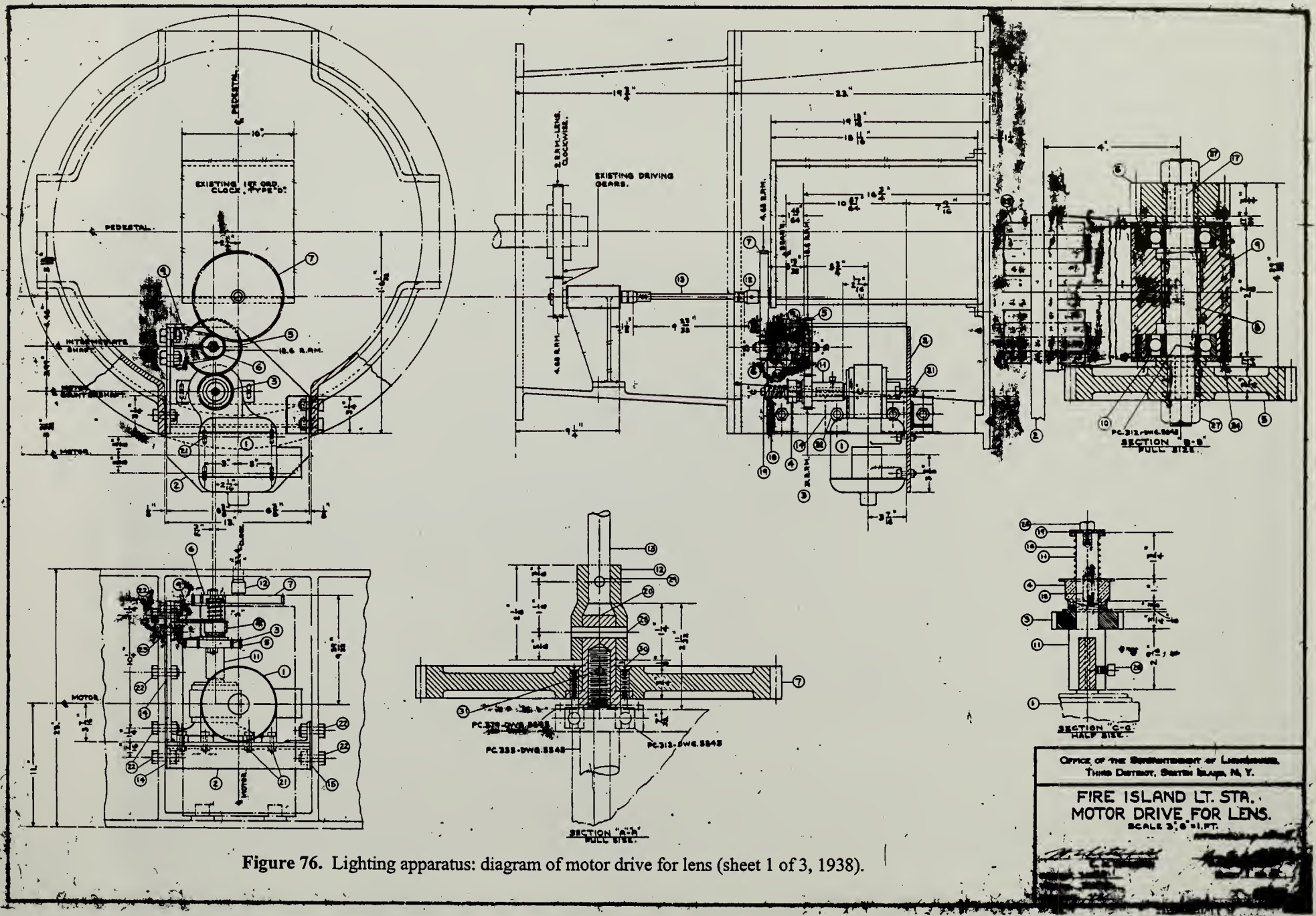


Figure 76. Lighting apparatus: diagram of motor drive for lens (sheet 1 of 3, 1938).

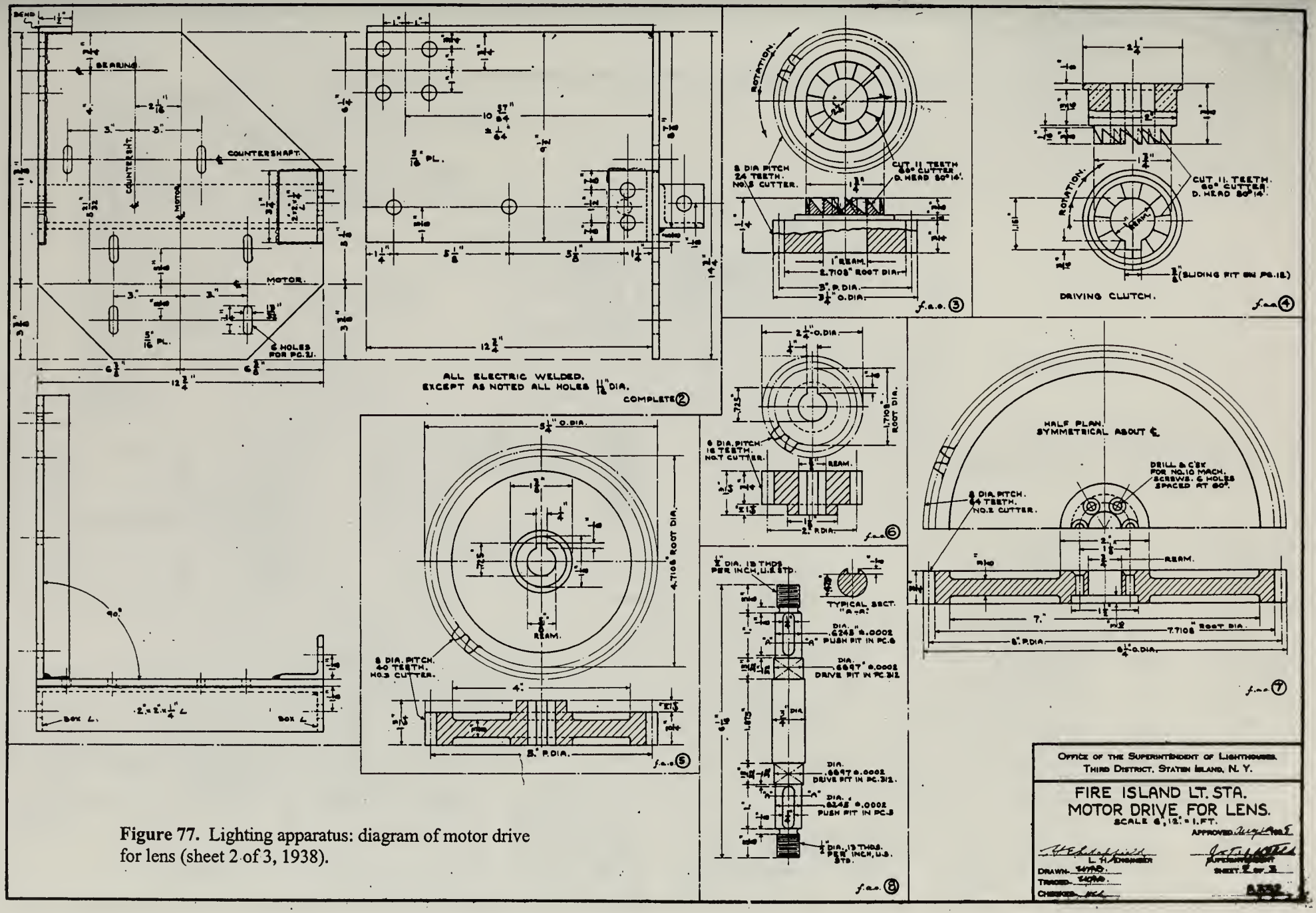
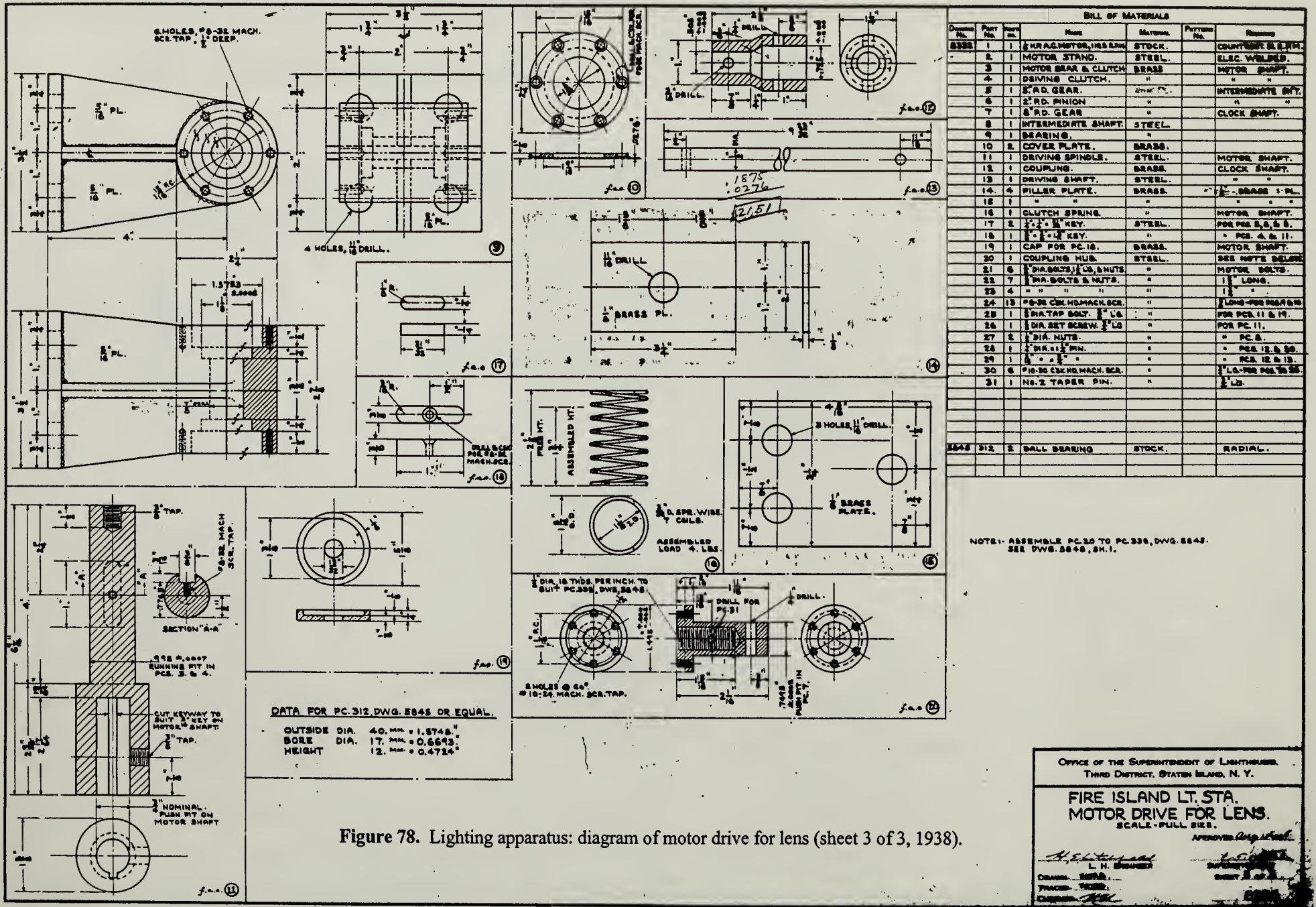


Figure 77. Lighting apparatus: diagram of motor drive for lens (sheet 2 of 3, 1938).



BILL OF MATERIALS

Drawing No.	Part No.	Req'd	Name	Material	Pattern No.	Remarks
5838	1	1	¼ H.R.A.C. MOTOR, 1425 R.P.M.	STOCK.		COUNTERSUNK 82 & 83.
-	2	1	MOTOR STAND.	STEEL.		ELEC. WELDED.
	3	1	MOTOR GEAR & CLUTCH	BRASS		MOTOR SHAFT.
	4	1	DRIVING CLUTCH.	"		" "
	5	1	5" P.D. GEAR.	"		INTERMEDIATE SHT.
	6	1	2" P.D. PINION	"		" "
	7	1	8" P.D. GEAR	"		CLOCK SHAFT.
	8	1	INTERMEDIATE SHAFT.	STEEL.		
	9	1	BEARING.	"		
	10	2	COVER PLATE.	BRASS.		
	11	1	DRIVING SPINDLE.	STEEL.		MOTOR SHAFT.
	12	1	COUPLING.	BRASS.		CLOCK SHAFT.
	13	1	DRIVING SHAFT.	STEEL.		" "
	14	4	FILLER PLATE.	BRASS.		⅜" - BRASS 1 PL.
	15	1	" "	"		" " "
	16	1	CLUTCH SPRING.	"		MOTOR SHAFT.
	17	2	⅛" x ⅛" x ⅝" KEY.	STEEL.		FOR PCS. 3, 5, & 8.
	18	1	⅛" x ⅛" x ½" KEY.	"		" PCS. 4. & 11.
	19	1	CAP FOR PC. 18.	BRASS.		MOTOR SHAFT.
	20	1	COUPLING HUB.	STEEL.		SEE NOTE BELOW.
	21	6	¼" DIA. BOLTS, 1" LG. & NUTS.	"		MOTOR BOLTS.
	22	7	¼" DIA. BOLTS & NUTS.	"		1" LONG.
	23	4	" " " "	"		1½" "
	24	13	#8-32 C'SK. H.D. MACH. SCR.	"		⅜" LONG - FOR PCS. 8 & 10
	25	1	⅜" DIA. TAP BOLT. 1" LG.	"		FOR PCS. 11 & 19.
	26	1	⅜" DIA. SET SCREW. ½" LG.	"		FOR PC. 11.
	27	2	⅜" DIA. NUTS.	"		" PC. 8.
	28	1	⅛" DIA. x 1½" PIN.	"		" PCS. 12. & 20.
	29	1	⅛" " x ⅞" "	"		" PCS. 12. & 13.
-	30	6	#10-32 C'SK. H.D. MACH. SCR.	"		⅜" LG. - FOR PCS. 26 & 28.
	31	1	No. 2 TAPER PIN.	"		½" LG.
5845	312	2	BALL BEARING	STOCK.		RADIAL.

NOTE 1- ASSEMBLE PC. 20 TO PC. 338, DWG. 5845. SEE DWG. 5845, SH. 1.

OFFICE OF THE SUPERINTENDENT OF LIGHTHOUSES. THIRD DISTRICT, STATEN ISLAND, N. Y.

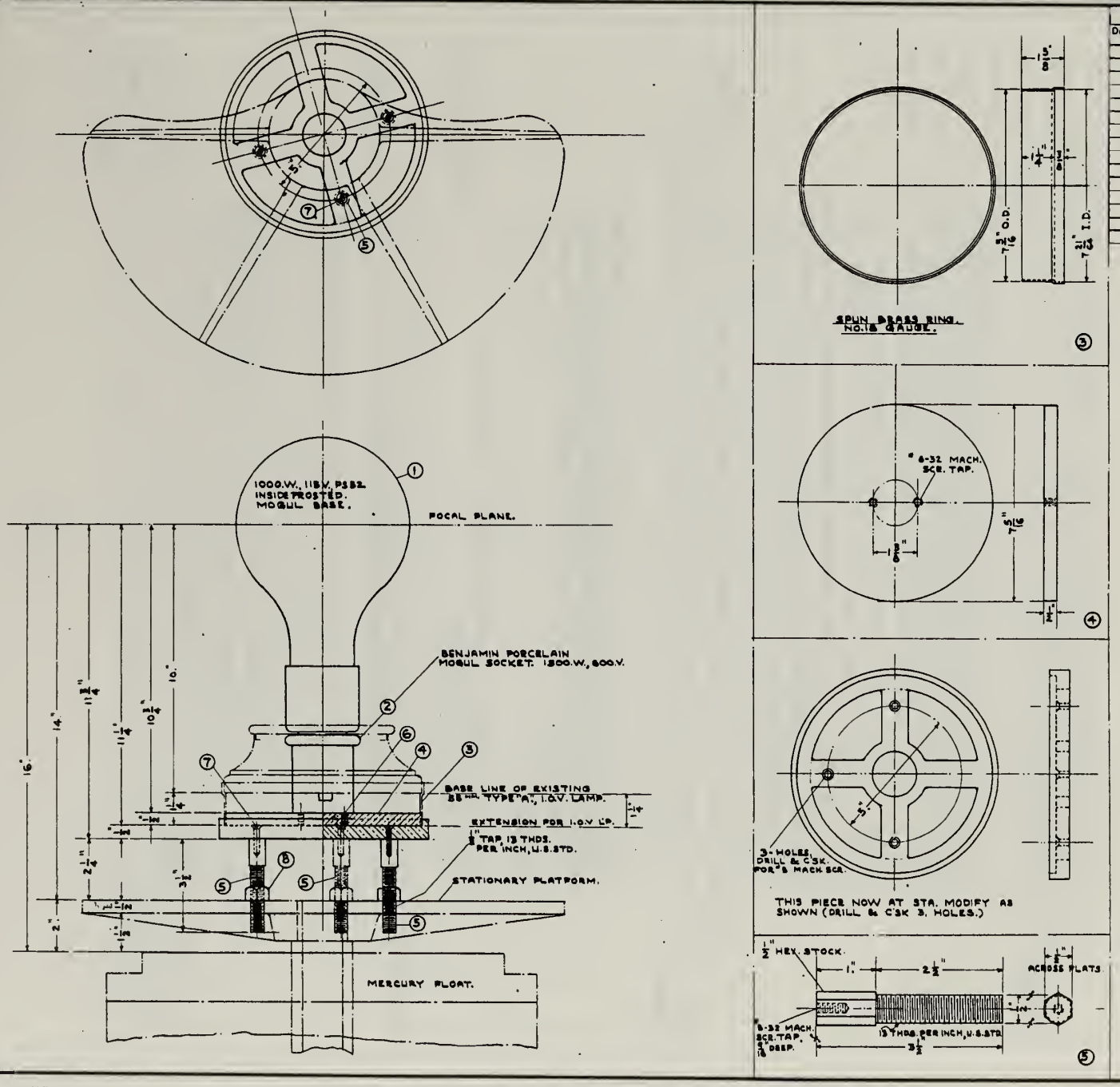
FIRE ISLAND LT. STA.
MOTOR DRIVE FOR LENS.
SCALE - FULL SIZE.

APPROVED: Aug. 4th 1938.

L. H. ENGINEER

DRAWN: M.F.B.
TRACED: W.H.B.
CHECKED: K.B.L.

Figure 78. Lighting apparatus: diagram of motor drive for lens (sheet 3 of 3, 1938).



BILL OF MATERIALS

Drawing No.	Part No.	Pieces no.	Name	Material	Pattern No.	Remarks
	1	1	ELECTRIC LAMP.	STOCK		
	2	1	MOGUL SOCKET	"		
	3	1	EXTENSION RING	SPUN BR.		FOR I.O.V. LAMP.
	4	1	BASE PLATE.	BRASS.		
	5	3	SUPPORTING STUD	"		ADJUSTABLE
	6	2	#8-32 RD HD MACH. SCR	"		1" LONG.
	7	3	" C'SK " " "	"		1" LONG.
	8	3	1/4" HEX. NUTS.	"		

Figure 79. Lighting apparatus: section and plan of lamp stand (1938).

OFFICE OF THE SUPERINTENDENT OF LIGHTHOUSES
THIRD DISTRICT. STATEN ISLAND, N. Y.

FIRE ISLAND LT. STA.
LAMP STAND.
SCALE 6", 12" = 1 FT.
APPROVED AUG. 10 1938.

L. H. ENGINEER
SUPERINTENDENT

DRAWN.
TRACED.
CHECKED.

SHEET 1 OF 1

8336.

FINISHES

Exterior Finishes

The prime function of the lighthouse tower was to provide a base and structure to best expose "the light." A secondary role of the tower was to serve as a daymark for mariners, so it was important to have a finish treatment that would distinguish the tower.

1858 Finish

A letter from the Lighthouse Board to Third District engineer Morton, dated May 27, 1858 (App. C-51), contained the following reference specifying the color for the second Fire Island lighthouse, which was then under construction:

> The color is to be yellow. This is to make it different from Shinnecock Bay Great West Bay L H. and from Barnegat L H. on the Jersey shore. You can experiment on the tower part of the tower to determine what will be the best wash & coloring matter. Lime is preferred to make the wash, not only on account of first cost, but because the expense of keeping up the color with paint is constant and much larger than it is with lime. Yellow ochre is a good color, and a little salt mixed with the wash makes it set well and gives a glaze to it. It might be well to try the effect of mixing cement with the lime in small proportions.

Lt. Morton followed the board's advice, and pursued an acceptable method of applying a yellow wash. He reported to the board his findings in a letter dated July 12, 1858 (App. C-55), as follows:

> During my visit, (on the 9th), to Fire Island, I inspected the experimental washes of cement on the brickwork of the Tower, and have concluded the two coats, making a layer of about $^{1}/_{8}$ inch thick, will render the tower impervious to water.
>
> I will have different colourings tried until I find one which will give an agreeable cream yellow colour.
>
> In a day or two I will send you an estimate of the cost of this sort of coating per sq. yard; and of a similar coat of Roman Cement.
>
> I propose to apply this method at G. West Bay, Lloyds Harbour, and Fire Island.
>
> As soon as you will inform me whether you approve it, I will send in the estimate for Lloyds Harbour: a cream colour will look well there; and at Great West Bay, the brick colour can be obtained by mixing umber with the cement.

The Lighthouse Board did not hesitate to give Lt. Morton its approval to proceed with his recommendations for coating and finishing the shaft. A response by the Lighthouse Board was prepared July 14, 1858 (App. C-56):

> Your suggestions as to the coating of Fire Island, & Great West Bay Lighthouses are approved, & you are authorized to carry them out according to the tenor of your letter on the subject.

The Notice to Mariners issued July 3, 1858 (App. C-54), notes the new lighthouse tower at Fire Island will be a "cream or yellow color."

1865 Finish

In spite of attempts to provide a durable finish coating for the tower, the harshness of the sea environment seemed to prevail throughout the structure's history. Four years after the construction of the lighthouse, the annual report for 1862 (App. C-66) described the tower as already in need of painting. Recommended treatment was three coats of oil paint. The 1863 annual report included an estimate for repainting the tower for the next season. Apparently, the specified work was not carried out until 1865–only after the district engineer pressured the board with his concern over the poor condition of the tower's finish. The engineer wrote the board on May 5, 1865 (App. C-67), as follows:

> As stated in my annual report and before, the yellow wash on the outside of the tower has to a great extent disappeared, especially on the sea side, thus causing the tower to appear to Mariners like that at Great West Bay. The tower on the N.E. side also requires repointing, some soft brick ought to be replaced by new hard brick previous to rewashing the tower.

The annual report for that year outlines the work accomplished, as follows:

> The outside of the tower at this Station was thoroughly scraped of the yellow wash; imperfect brick were replaced by sound ones, the joints were scraped and repointed with cement mortar and the whole outside was painted with three coats of paint.

1870's Finishes

Six years later, in 1871, the finishes of the brick shaft again required attention. The annual report for the year (App. C-74) commented on the severity of the condition:

> The outside painting on the tower is very defective and does not appear any more in the color as represented in the Light-house List. Many bricks are decayed and require to be replaced with sound hard brick and this done the tower is to be repointed.

The item of repainting and refinishing the lighthouse tower was continually attended to throughout the decade of the 1870's. Whether the tower received two complete finishes during this decade–or only one that was applied over a period of years–is not clear from the surviving documentation.

The October 1871 monthly report (App. C-74) records that "...the tower repointed and crumbled brick replaced. A cement wash of Portland Cement two coats, has been applied." In October of the following year the monthly report included that "the tower [was] cement-washed in yellow color."

The monthly report for December 1873 (App. C-74) noted "the balance of appropriation is required for coloring and recementing the tower next spring." By April, the cement and coloring matter for cement washing had been sent to the Fire Island station, and in May, orders had been given for cement-washing the tower. The annual report for 1874 (App. C-74) described the tower as needing yellow wash, and as leaking badly. Figure 9, a drawing from 1874, is the earliest post-construction view known to the National Park Service. It shows the structure as being all of one color. That year saw the tower pointed and cement-washed.

The annual and monthly reports for the next several years included commentary on the exterior finishes of the brick shaft:

1876 - "the tower has been cement-washed anew as well as the hallways" (June annual report);

1877 - "the tower has been thoroughly cement-washed" (June);

1878 - "the tower has been pointed and cement-washed" (May); and

1879 - "the tower needs to be repainted" (June annual report).

1891 Finish

A survey of the Fire Island lighthouse was undertaken in March 1880 (App. C-86). Simply noted was the color of the tower (yellow), and how the color was produced (cement wash). No reference was made to the condition of the exterior finish, although the annual and monthly reports provided specific data on that topic. The annual report for 1881 (App. C-85) indicated that the tower was again in need of rewashing, and that its roof leaked. The brick shaft was not completely repainted again until 1891, when the first significant change in the exterior finishes was undertaken. This was the change from a single uniform color of yellow cream, to black and white stripes.

Repairs to the brickwork were a constant maintenance item during the 1880's. The annual report for 1885 (App. C-85) described the condition of the tower as follows: "The tower is slightly cracked in places, and the bricks on the outside are considerably chipped."

Figures 11 and 12 are the earliest extant photographs of the lighthouse showing its uniform light color. Both the brick shaft and the metal lantern appear to be painted yellow-cream. The windows look to be darker in the figures. Documentary data and paint samples from the sashes suggest that the frames and sashes were grained to resemble oak. The photographs are of a fuzzy quality, so it is difficult to discern details. Figure 12 appears to depict several areas of deteriorated and missing wash, where the brick substrate is exposed to the elements.

Repointing work was performed on the tower's exterior in 1888. The tower base was "cemented"; the tower deck and window niches were pointed, as well. This was followed by the "Lantern deck and parapet" being pointed. The annual report for 1889 (App. C-85) made reference

to the fact that "the outside of the tower needs to be cemented-washed." This problem was mentioned again in the 1890 annual report (App. C-94) as follows: "The outside of the tower in which the bricks are weatherworn needs repairs."

During the succeeding year, action was taken upon the poor exterior condition and continual maintenance problem of the tower's brick shaft. The problem was addressed in a letter dated February 16, 1891, by Major D.P. Heap–the district engineer–to the Lighthouse Board (App. C-96). The subject as stated as "Fire Island-Preserving Tower." The text of the letter is included below:

> I have the honor to state that for some time past the brick in the Fire Island tower have been crumbling owing to the action of the salt air.
>
> I propose, with the approval of the Board, to attempt to remedy this by applying a coat of asphalt paint. This will have to be done during warm weather when the bricks are free from moisture.
>
> As the Asphalt paint is black this remedy will change the appearance of the tower as a day mark. At present it is indistinct - if it desired to make it unmistakable in appearance and visible at a long distance I would recommend that it be painted with two bands of white, a general idea of how it would look from seaward is shown in the accompanying sketch. [The sketch is included in this report as figure 16.]

On March 2, 1891, the Naval Secretary to the Lighthouse Board read the February 16, 1891, letter to the board. The recommendation by engineer Heap to apply the black asphalt paint and change the color of the lighthouse to white and black was approved (App. C-97). Appendix C-98 includes a letter of approval from the board to the engineer. A Notice to Mariners was issued August 6, 1891 (App. C-99), under the title of: "Change in the Color of the Tower at Fire Island Light-Station." The commentary accompanying the title follows:

> Notice is hereby given that, during the month of August 1891, the color of the tower at Fire Island Light-Station, south side of Long Island, N.Y., will be changed from yellow to alternate bands of black and white, two of each color. Each band will be about 35 feet wide.

The monthly report for August 1891 (App. C-94) includes comment that work was being performed: "The material for changing the color of the tower to horizontal stripes white & black has been delivered and workmen are engaged in putting it on." Appendix C-100 is an invoice dated August 29, 1891, for 300 gallons of asphaltic slag paint for painting the tower; the cost was $183.61. The tower had received its new treatment by the end of September, as the monthly report for that month attests: "Painted tower alternate bands of black and white." Figure 17 includes two views extracted from light lists for two years following the change in color: a sketch from the 1892 *Light List*, and a photograph from the 1895 *Light List*. Figure 18 is similar to that which appeared in the 1895 *Light List*.

Repointing repairs were recorded in the annual and monthly reports for 1895. The Watch Room deck was pointed and grouted, as well as other areas not specified.

Figure 20 dates to August 12, 1900, and offers a clear image of the tower; individual bricks can even be discerned. The brick shaft appears to be in impeccable condition. There is no evidence

of paint loss, although the extent of prior brick erosion is apparent by the uneven surface quality. The lantern is painted black, while the window sashes are painted white.

1912 Finish

The asphaltic paint did not solve the lighthouse's problems, however, and the quest to find a more durable coating for the tower at Fire Island continued into the next century. On March 5, 1901 (App. C-106), the Third Lighthouse District engineer wrote the board requesting plans and specifications for the protective coating recently applied to the lighthouse at Grande Pointe au Sable, Michigan (in the Ninth Lighthouse District). An article describing the treatment had appeared in the March 2, 1901, *Engineering Record* (App. C-107). The Third District engineer commented that the brick tower at the Fire Island Light Station had for some years disintegrated in the same way. The *Engineering Record* article opened with the following statement:

> The question as to repairs or rebuilding of a brick light-house tower is one of the perplexing problems of the light-house engineer. A tower has been standing, say, from 30 to 40 years. During the last few years complaint after complaint has been coming in regarding its condition. The bricks are disintegrating, cracks appear in the surface, the water soaks in, fears are expressed regarding its stability, and so on. Minor repairs have been made, the tower has been pointed up, cement has been used liberally, and for a short time the tower gives satisfaction. This has been done year after year until finally it is found necessary to either make some radical repairs to the structure or build an entirely new tower. Rebuilding is expensive and only to be resorted to in extreme cases. Several methods have been proposed for repairing and strengthening a tower at a moderate cost, so that for a considerable time to come it will remain in good condition and subserve all the functions of a new tower....

The article then proceeds to describe three methods of repair.

A "Requisition for Extra Supplies," dated January 15, 1910, includes an item of white and black exterior tower paint. The quantity of paint required is not clear on the requisition, so it is not known if the tower was painted completely at this time.

Serious attention was finally given to the matter of applying a protective coating to the tower at Fire Island in 1912. In April an investigative report was prepared describing the condition at the time (App. C-121). Included was the following commentary:

> The surface of the brick and mortar patches on the outside spalls off, carrying the paint with it. Some of the pieces that fall off are as large as 18 inches in diameter and 2" thick. During the last few months cracks have developed in the upper part of the tower and show on the inside. There is a horizontal wind crack which extends halfway around the tower on the north side at an elevation of 130 feet above the ground; a vertical crack on the south-west side at an elevation of 120' and a vertical crack on the south-east side 12' long and one 13' long on the north side, both at an elevation of 103 feet.
>
> The tower sways considerably in a strong wind.

On April 25, 1912, a recommendation for installing reinforcing bands and a protective coating on the tower was initiated by the Office of Lighthouse Inspector, Third District (App. C-122). The estimated cost for this work was $4,032.50. Material costs were estimated at $1,205, and the work was to be performed by the "Depot force" (App. C-123). The recommendation stated:

> It is necessary that tower be repaired before another winter, and it is proposed to do same as shown on Blue Print No. 5155, and in accordance with instructions and specifications attached.

The working drawing identified as No. 5155 is included here as figure 57. The details of the system for attaching the metal reinforcing bands and coating are obtainable from the drawing. Some 250 sheets of expanded metal reinforcing were ordered for the job (App. C-122). Apparently detailed specifications were not prepared for this work, since the project was performed by hired labor under the direction of the district inspector (App. C-132, p. 2). Two specifications were prepared, however, for use in purchasing the metal reinforcing (App. C-132, p. 4) and mineral oil (App. C-132, p. 5).

The progress of work was recorded throughout the project (Apps. C-125 and C-126). A report dated December 9, 1913, was prepared by the Third District lighthouse inspector for the lighthouse inspector of the 12th District in Milwaukee, Wisconsin (App. C-132, pp. 2-3). This report concerned the methods of doing work, and the actual costs involved. The methodology as described by the inspector is included as follows:

> The entire surface of tower was chipped to insure bond of the cement, the chipping being done by pneumatic hammers. The air for same was supplied by a 13 H.P. De LaVergne Oil engine, direct connected to an air compressor. A hoist was attached to this engine and same was used for hoisting material.
>
> The work was commenced at bottom of tower, and coating applied in two coats, the second being applied before first had become hard to insure bond. The work was done from stagings, the same being built up as work progressed.
>
> There were several cracks in tower, one crack extending completely around the tower. In places where cracks existed, the tower was reinforced with iron dogs, before cement coating was applied.
>
> Before coating was applied, the tower had excessive sway and vibration, and large sections of the brickwork were continuously spalling off, especially in cold weather. All of this was stopped by the coating applied.
>
> To date the work has proven highly satisfactory, no large cracks, loosening, or other defects having occurred.
>
> Atlas Cement mixed two to one with sharp beach sand was used, and to each barrel of cement there was added six gallons of heavy residue mineral oil as a waterproofing.

The grand total for the project was $6,155.91. The amount beyond the estimate was due to greater difficulty than anticipated in chipping the tower, placing the reinforcing iron, and constructing the staging (App. C-131).

Figure 27, a pre-1912 photograph, depicts the tower before the protective coating was applied. The detailing of the tower's cornice and pilasters, under the lower balcony, is clearly apparent. Also visible are the Watch Room's dentils, under the upper balcony. The protective coating obliterated much of this detail because of its thickness: in some areas, the reinforced concrete coating is 3 inches thick. Figure 29 dates to June 12, 1921, after the application of the concrete coating. It shows the loss of architectural detail under the cornices.

A year following the introduction of the protective coating, a conditions report was made to the lighthouse inspector by the superintendent (App. C-132, pp. 6-7). The superintendent recorded the following conditions:

> I examined the surface of the tower for cracks, and found that between each successive belt section, there were horizontal cracks. Also that about 20 percent of the area of the lower 40 feet of the tower, the surface of the cement work was crazed.
>
> I tested the adhesion of the cement plaster to the brickwork by sounding with a hammer, and found that about 60 percent of the lower 20 feet of the tower sounded loose. I also tested the upper part of the tower adjacent to windows in a similar manner, but could not discern any sound of hollowness.
>
> Test holes were cut with a chisel through the cement plaster, at such places where the hollowness of sound was most apparant [sic]. I found that the thickness of cement plaster averaged about 2 ½ inches and that there were no voids between the cement plaster and the brickwork. The brick was very soft at these places, and experienced no difficulty in running a knife blade between the cement plaster and the brick, disintegrating the brick as the blade advanced.
>
> There is a leak under the stone lantern platform, and water tracks through the walls, discoloring and flaking off the whitewash on the interior of the tower.
>
> Notwithstanding the defects hereinbefore mentioned, the effectiveness of the work is very apparant [sic]. The vibration of the tower has been reduced considerably, and the keepers no longer experience any discomfort when standing their watches in windy weather. The tower presents a neat appearance, a smooth surface without any discoloration.

The reinforced cement-plaster coating was thoroughly examined again in May 1914. The report indicated that no new cracks or defects had developed since the December report was prepared (App. C-132, p. 11).

1945 Finish

Documentation is scant regarding the structure's finishes after the protective coating was applied in 1912. It is not known how many times the tower was repainted during that period. There is evidence, however, for a painting in 1945. This evidence consists of three photographs, two of which are included here as figures 36 and 37. Figure 36 shows the structure being painted, while figure 37 shows it after painting.

Circa-1960 Finish

By 1956, the brick shaft had lost large portions of its painted finish (figs. 40-41). Apparently the structure had not been painted since 1945. Figure 58 is a drawing dated October 21, 1960, entitled "Resurfacing Tower Exterior." It shows the area of the tower to be repaired and treated. The treatment seems to have consisted of a thin, paint-like application of "white mica-mastic." Paradoxically, the photograph thought to date from this work–Figure 42–shows the tower as being completely black at one point in this project.

The tower continued to deteriorate. In a USCG memorandum dated May 23, 1966, the scaling on the concrete coating was discussed in an effort to find a solution. The memo stated that:

> Permanent repairs to the structure to prevent further deterioration and injury (or death) to personnel from falling stucco are required now. Permanent repairs will cost $120,000. Temporary repairs, with no guarantee of permanence will cost between $35,000 and $56,000. In 1965, $11,500 was spent on repairs which are already failing. Since 1950 over $38,000 has been spent on repairs.

This memorandum references an engineering report submitted in May 1966 by the Leonard S. Wegman Company, but which has not been located.

A survey dated August 4, 1975 (App. C-155), refers to the brick tower as being in "poor condition, [with] exterior scaling, high maintenance." An inspection of the site on October 17, 1975 (App. C-156), found the following:

> The condition of the exterior metal reinforced concrete sheathing is considered to be beyond the capabilities of station or group personnel for preservation and is in fact considered to be beyond the "preservation" stage for standards of maintenance, but will require rehabilitation.

Interior Finishes

The documentation for interior finishes at the Fire Island lighthouse is almost nonexistent. These finishes lacked the importance of the exterior ones, and so apparently received little attention.

1858 Finish

The 1861 specifications for a "Brick Tower" (App. D-1) describe the finish of lighthouses to be as follows: "the interior brickwork of tower must be painted with three coats of white lead in oil, well laid on." Also,

> All the ironwork of structure must be painted with two coats of white lead in oil, at the workshop; and when fixed in the tower, to receive two additional coats of green paint and one coat of varnish.

Paint analysis of samples taken from the brick walls was inconclusive as to whether or not lead-based oil paint was used initially on the lighthouse's interior walls. The color of the finish, however, has always been white. The earliest paint layers in samples taken from the central column and the main stairway in the tower are an olive-green color, which does suggest the use of a system of coatings similar to that described in the specifications.

Subsequent Finishes

The monthly and annual reports contain very few references to repainting the interior of the lighthouse. There is one mention of the iron stairway being repainted in 1865 (App. C-66), and one mention of the interior walls–at least those of the "hallways"–being "cement-washed" in 1876, along with the exterior walls (App. C-74).

CHRONOLOGICAL LIST OF REPAIRS AND ALTERATIONS TO THE LIGHTHOUSE, 1862-1939

(Compiled from Historical Documents)

1860's

1862
- est. submitted for tower painting, three coats of oil paint
- est. submitted for lantern curtains

1865
- exterior yellow wash scraped; imperfect brick replaced by sound ones; joints scraped and repointed with cement mortar; whole outside painted with three coats of oil paint
- iron tower stairway repainted and repaired; heavy springs installed in newel of stairway
- noted that lantern roof leaked and needed repair and repainting

1869
- illuminating apparatus overhauled and adjusted; a Funck lamp replaced the mechanical lamp

1870's

1871
- crumbled brick repointed and replaced; exterior cement-washed with two coats of portland cement–yellow color
- speaking tubes and alarm bell attached to the tower

1874
- noted that tower leaked; exterior cement-washed and repainted
- closet installed in lantern room for storage
- noted that lightning conductor was not properly led
- three coats of paint applied to buildings throughout

1875
- measurements made for repairs, etc., of revolving machinery of lens
- roof of lantern patched
- new chimney cap set up, and stovepipes adjusted and overhauled (probably tower)

1876
- Watch Room floor resheathed
- flashing machinery of lens had new chariot rollers fitted; apparatus placed in good running order
- tower cement-washed anew, including hallways

1877
- exterior thoroughly cement-washed
- new railing posts for lower balcony made and fitted; railings repaired
- rubber-coated cords fitted to lantern curtain rollers
- one lens panel of illuminating apparatus damaged and repaired

1878
- telegraph wire attached to tower

1880's

1881
- noted that tower rewashing was required, and that roof was leaking

1882
- new set of lamp burners furnished

1883
- illuminating apparatus received lampist's attention

1884
- first-order mineral-oil burners installed and lighted for the first time July 8, 1884; kerosene replaced lard oil as fuel
- lantern strengthened and better secured

1885
- noted that tower was slightly cracked in places; exterior bricks were considerably chipped

1886
- lantern thoroughly overhauled and refitted with new screws
- lamps and burners overhauled and repaired

1887
- plate glass for lantern repairs procured
- lantern reglazed, and new screws substituted for those worn out by rust

1888
- glazing of lantern repaired, and roof put in good order
- storm door to Watch Room entrance repaired and refitted
- noted that doors and windows required repairs (probably tower)
- noted that tower leaked
- base of tower cemented
- tower deck pointed
- area around windows pointed
- new lining for lantern dome received

1890's

1890
- noted that outside tower bricks were weatherworn and required repairs

1891
- noted that outside of tower needed paint or wash; pointing was falling out and bricks were chipping off
- noted that tower interior needed a handrail for stairway
- noted that material for changing the color of the tower to white and black horizontal stripes was delivered, and workmen were engaged in its application (300 gallons of asphaltic slag)
- tower painted with alternate bands of white and black

1892
- new collar fitted on lantern dome to hold pipes

1894
- noted that proposed change of the characteristic of the light was well advanced
- platform built on the level of main lantern deck
- fourth-order lantern set up, with the exception of roof
- Watch Room deck of tower pointed and grouted; lantern glass and roof of the temporary fourth-order lantern fitted

1895
- iron work necessary to adapt the lantern to the new apparatus fitted and stored at depot
- fourth-order lantern placed on a bracket on the south side of tower
- tower pointed

1896
- new governor, brass bushings for clockwork of lens, one drill, and one tap furnished
- clock repaired
- lens leveled
- 16 new bolts in lantern braces installed
- lining and iron door of lantern repaired
- two damper pipes overhauled
- new bell pull for tower furnished
- fourth-order iron lantern removed
- lamps overhauled and packing rings to pistons fitted

1897
- nine plates of lantern glass furnished
- lens leveled; revolving machinery of lens overhauled, and
- measurements for new parts taken
- two lamp dampers repaired

1898
- new chariot for lens furnished and fitted
- telephone connection established May 5th
- six plates of lantern glass furnished
- four steel set screws for lens furnished
- two first-order damper rods for lamps furnished

1899
- 10 plates of lantern glass and 4 storm-pane clamps furnished
- one steel bolt for lens pedestal furnished
- new clock for revolving lens made and fitted
- 12 balls for bearing of lens chariot wheels furnished

1900's

1900
- eight plates of lantern glass–four measuring $27^{11}/_{16}$ inches by $38^{5}/_{8}$ inches, and four measuring $27^{11}/_{16}$ inches by $39^{1}/_{8}$ inches–and five pairs of knobs and three catches for doors furnished
- revolving machinery of lens overhauled
- plunger valve of lamp repaired

1901
- one burner and float chambers for first-order lamp repaired
- noted that new door, storm panes, and clamp for lantern were required
- noted that new railing for lower balcony required
- three cells of victor dry battery for telephone furnished
- two new ratchet pawls made and furnished
- noted that machinist was sent to station to measure for new iron railing for lower balcony

1902
- hammers of keeper's call bell in tower refurbished: one new one supplied, old one repaired
- two oil carriers and one first-order burner repaired and returned to station
- new iron railing fitted on lower balcony

1903
- two ratchet pawls for lens furnished
- new iron door to lantern fitted
- two new rollers on outside storm door of lantern fitted
- curtain rollers of lantern repaired
- one first-order lamp repaired
- six plates of lantern glass furnished

1904
- two brass speaking tubes from tower to Watch Room furnished

1905
- three sections of new lining in dome of lantern fitted
- new smokestack supplied
- copper roof of lantern repaired

1906
- 10 plates of lantern glass furnished

1907
- two new dampers and rods for first-order lamps furnished
- fuel changed from oil to incandescent oil vapor; new vapor lamp installed and placed in operation December 3 (the duration of flash was reduced to 4 seconds, and the dark interval increased to 56 seconds)

1910's

1911
- new door to Watch Room installed

1912
- tower resurfaced; reinforcing bands installed, and concrete coating applied
- bird guard installed on lantern
- 16 railing posts removed from upper balcony

1918
- ball on lantern roof struck by lightning on August 30 (lightning burned small place on column, ran down the call-bell wire to hall of dwelling, burned out telephone wire, and demolished switch box connected with telephone); damage repaired

1930's

1932
- lens replaced with more efficient lens and apparatus (lens and mercury float apparatus transferred from Shinnecock Bay Light Station)

1933
- Fresnel lens transferred to the Franklin Institute, Philadelphia, Pennsylvania

1938-1939
- light changed from I.O.V. (incandescent oil vapor) to electric incandescent lamp (commercial electricity available)

CHAPTER 6.

THE LIGHTHOUSE: CURRENT APPEARANCE AND CONDITION

TOWER

Foundation

Description

Materials Rubble and concrete, faced with granite.

Dimensions and Design The foundation was not excavated, so it is presumed that the historical description (in Chapter 5, "Tower") holds true today.

Historical Background

There is no record of the foundation ever having been changed, so the present arrangement is probably the historic one.

Plinth

Description

Materials Pink-gray granite slabs, rough-cut and possibly dressed with a pitching chisel.

Dimensions Diameter 33 feet.
Granite slabs of two sizes: long, rectangular stones (24 inches high by 52 inches wide) and square stones (24 by 24 inches).

Design The rectangular stones alternate with the square stones. The square stones appear rougher in finish. The stonework extends out 6 inches from the brick tower. Its exposed upper surface is sloped to shed water. On either side of the south entry at the seventh stone is a ring anchor, whose original function is not known. The west anchor is complete; the east one is not.

Documentation

Figures 80-81.

Paint samples FIIS 13 P061: tower exterior, base.

Historical Background

There is no record of the plinth ever having been repaired, with the possible exception of repointing. The present situation is therefore probably the historical one.

Exterior Walls

Description

Materials Brick shaft; granite details.

Dimensions Tower height from the foot to the top of the cornice, 140 feet.
Interior diameter of tower at base, 10 feet 6 inches.
Thickness of walls at cornice, 2 feet 4 inches.
Bricks 7½ to 7¾ inches long by 3½ inches wide by 2¼ inches deep.

Design The lighthouse shaft is circular in plan and based upon a hyperbolic curve. The shaft is embellished at its upper end with a granite cornice that serves as a balcony. The brick shaft continues beyond the balcony, providing the support for the first-order lantern. A protective concrete coating was applied to the shaft in 1912. This coating, as much as 3 inches thick in some areas, has obliterated the original decorative brickwork, including the Watch Room's cornice dentils and the tower's pilasters and frieze. All that remains exposed are the tower's granite Doric pilaster capitals and granite triglyph capitals.

The shaft is punctuated by two doorways on its south elevation (one at ground level and one at the Watch Room level), and by six windows. The windows appear to be erratically located on the exterior, because they are associated with the interior stairway landings. Positioned between the tower neck's pilasters are five niches: four are blind, while one features round-headed double casement window sashes. Three round window openings (roundels) are located in the frieze of the shaft on its north elevation. These roundels are currently covered with plywood.

Above the plinth are 14 drainage holes between 1½ to 2 inches in diameter. These holes are approximately 6 feet 5 inches apart. At the Watch Room level there are five openings related to the interior vent boxes. These rectangular openings are currently covered with wire mesh.

Finish The tower shaft received a protective coating of reinforced concrete in 1912. This coating still covers the tower. The tower is finished with four black and white stripes–white at the base, followed by black, then white, and finally capped by black. Remains of former black asphalt and "white mica mastic" coatings are visible.

Condition Large areas of the protective concrete coating have detached from the shaft and fallen to the ground. This condition is chronic, especially in the lower black stripe. The reinforcing lath has corroded and lost its binding power. Large cracks have formed in the lower white stripe. Cracks are numerous in the upper black stripe, as well. Mortar is missing and washed away from the joints throughout the exposed sections. The brick is severely spalled in areas from which the coating has fallen.

Documentation

Figures 50, 82-89.

Paint samples FIIS 13 P001: Watch Room exterior, brick (fig. 90).
FIIS 13 P005: Watch Room exterior, upper several courses of brick (fig. 91).
FIIS 13 P008: Tower exterior, brick (fig. 92).
FIIS 13 P067: Watch Room exterior, wall adjacent to ladder.
FIIS 13 P068: Watch Room, wall from lower balcony.

Historical Background

The most dramatic 19th-century alteration in the tower's exterior appearance was the conversion from a uniform single color (yellow-cream) to black and white stripes in 1891. The most critical 20th-century change affecting the tower's current state occurred in 1912, with the introduction of the reinforced-concrete coating. This coating, because of its thickness, obliterated all of the decorative brickwork at the tower's neck and cornice. It covered over the Watch Room's cornice, as well. The stonework at the plinth, and at the tower's neck and cornice, remains visible.

Interior Walls

Description

Materials Walls are brick from the plinth to lantern, with the exception of the granite cornice, which is visible in the Service Room. (This stone comprises the upper third of the Service Room's wall.) Bricks are laid in brown beach-sand mortar. Two types of mortar are discernible visually.

Dimensions Bricks are typically 7½ to 7¾ inches long by 3½ inches wide by 2¼ inches deep. For arches and window niches, specially molded narrow bricks are employed. These bricks average $1\frac{1}{8}$ inches in width.

Granite cornice stones - three courses
Lower curved course - 26 to 27 inches wide by 14 ½ inches high
Middle course - 2 feet 23 inches wide by 14½ inches high
Upper course - 22 to 23 inches wide by 10½ inches high

Design Brick header courses run consistently throughout the structure, except for above windows and doorways. All headers are laid 3½ inches wide by 2¼ inches high. Mortar joints are almost flush with the brick face, and are not specially tooled.

Openings Three doorways, seven casement windows, three roundels; vents at ground level, fourth landing, Service Room, and Watch Room.

Finishes Whitewash throughout.

Features

Ground Level Entrance-hallway bricks are laid in an English common bond, one header course to one stretcher course. The arched ceiling consists of 37 courses of narrow bricks measuring 1⅛ inches wide by 7½ inches to 7 ¾ inches long. Twenty round holes (several inches in diameter) are found around the perimeter of the tower stairwell area. These openings are vent and drainage holes, some of which open to the outside.

Fourth Landing At this level there are seven vent slots measuring 2 inches wide by 8 inches high.

Sixth Landing A partition wall divides the tower in half at this level. The bricks of the partition wall are laid in stretcher bond, and no corbeling is featured at the ceiling level. The wall rests on an iron T-bar at the sixth landing. This wall features 50 courses of brick; the doorway begins at the 16th course down from the ceiling. The upper four courses of the circular tower wall are corbeled out to support the Service Room's floor. The joists for the Service Room floor are set into the brick wall. Paint evidence on the wall indicates that the several lower courses of brick were picked out in a contrasting color to the walls at some point in its history.

Service Room The walls of the Service Room consist of 27 vertically aligned courses of brick, topped by three courses of granite blocks–the tower's cornice–with the bottom course being molded in a convex curve. This arrangement supports one course of brickwork, on which rests the floor of the Watch Room above. The blocks in the molded course of granite are separated by brick fragments incorporated into the mortar at each vertical joint, presumably because the joints are so wide, that mortar would not support itself on the stone.

On the north side the brick wall exhibits three roundels 1 foot in diameter (currently covered with plywood). Three courses of brick headers in a circle provide the frame for the roundels. The jamb depths for these windows are as follows: NW and NE, 6¼ inches, and the center, 6½ inches. The brick wall also features seven narrow vents 2 inches wide by 8 inches long (three bricks in length). The depth of these vents varies from 13 to 14 inches. They are found 20 courses up from the floor level, and four courses down from the molded granite course. Four wooden pegs are embedded in the wall by the stairway.

Watch Room The Watch Room's walls consist of 33 courses of vertically aligned brick. The lowest three courses appear to have been painted a different color at some point, since orange and green "bleed" through the whitewash here. (This use of a contrasting color along the base of the wall is also seen in the room at the sixth landing.) There is evidence of orange paint on wall bricks above the base too, but not enough to determine if the walls were painted entirely orange. The round-headed doorway to the lower balcony sits in the south wall. The brick jambs of the doorway appear to have been painted black at one point, since traces of this paint remain. The notation "CO.13" is

painted in red on the wall east of the doorway, obviously for a fire-extinguisher location.

The Watch Room has no windows, but it does have two types of vents. Three courses above the floor level are six of the usual (2- by 8-inch) vent slots. Eighteen courses above the floor level are five cast-iron vent boxes set into the walls. The outside dimensions of the boxes are 15 inches wide by 13 inches high, while the inside dimensions are 11¾ inches wide by 9 3/8 inches high. They are 15½ inches deep. Within each box are two slotted plates set at an angle. The outermost plate has four vertical slots in it, and is fixed. The innermost plate rests on it, has three slots, and can be slid from side to side. When the inner plate is positioned so that its slots line up with those of the outer plate, fresh air will enter from the outside. Each plate measures 10 ¾ inches wide by 10 1/8 inches high by three-quarters of an inch thick. All components are of cast iron, painted black. There is also one hole 5¼ inches square, located two courses above one of the vent boxes. Its purpose is not known, but it does not seem to be original.

Conditions

General Moisture and the consequential movement of salts to the surface have broken the bond of the paint film to the brick's surface. Whitewash is flaking and totally detached throughout the interior of the lighthouse tower. Efflorescence commences at landing #2, but is most severe at landings #4 and #5. Green mold and staining resulting from the iron elements pervades the structure. The interior walls appear to be structurally sound, with only one vertical crack in the tower before the rooms begin. The Watch Room is plagued with the most severe cracking, concentrated below the flanges for the lantern floor and at the corners of the cast-iron vent boxes. Mortar for the most part is sound, but there are areas where the mortar joints have eroded to a depth of half an inch.

Entry Hallway Whitewash is deteriorated at the lower seven courses and adjacent to the doorway at ground level.

Below Landing #1 The whitewash is very solid. In the tower area, the whitewash is chipped east of the doorway and on the north wall, as well as on five courses at the wall base. Under the window at landing #1 is black staining; there is loss of whitewash on the opposite wall.

At Landing #1 The jambs of the window exhibit green mold and flaking whitewash.

Below Landing #2 The south wall is the worst area for loss of paint; the paint on the northwest wall is somewhat deteriorated.

At Landing #2 The wall area from south to west to north is without whitewash. The east wall is in good condition.

Below Landing #3	The east wall is in fairly good condition. The remainder of the area is deteriorated. Advanced efflorescence begins at landing #2. Brick mortar joints are eroded up to half an inch deep at the window.
At Landing #3	A section of the west wall is in good condition; the remainder is deteriorated. Severe efflorescence exists to the south of the window.
Below Landing #4	Efflorescence is most severe at this level.
At Landing #4	At this landing efflorescence is very bad east of the window. The whitewash west of the window appears stable; green mold and brown staining is present adjacent to the second vent slot west of window.
Below Landing #5	Efflorescence continues to be very concentrated in this area. Under the window is a green mold stain, and it appears that the sill is cracked. On the wall directly across is a small green mold patch.
At Landing #5	Solid whitewash is visible on the north wall at the landing.
Below Landing #6	Ceiling whitewash is intact at the center, but deteriorated closer to the walls. Green mold exists over the window at the corbeled cornice.
Room at Landing #6	The wall over the doorway in the partition exhibits severe paint loss; the outer wall, especially over the window, is plagued with the same condition. The interior partition wall to the east of the doorway is in good condition. No cracks or mold are evident in this area, only minor efflorescence. Efflorescence is concentrated on the north side of the tower, at the three bottom courses of brick. Mortar joints are eroded over the doorway and around the window to a depth of a quarter-inch.
Watch Room	The whitewash is deteriorated and peeling in patches throughout the room. The walls exhibit some spalled brick, and the bottom four courses appear to have a high moisture content. Green mold and staining are apparent to the west of the doorway, at ground level. Staining is evident elsewhere on the walls, too, especially on the north side. There is substantial rust staining under the vent boxes, particularly on the east wall. There are numerous cracks in the brick wall. They seem to have been caused by the flanges, or ribs, that support the floor of the room above. The cracks are most numerous on the west wall.
Service Room	The whitewash appears to have good adhesion to the granite, but not on the brick, except for the area around the roundels. Brick has spalled sporadically throughout the room. No cracks are visible in the wall. Efflorescence is concentrated around the east roundel and eastward along the brick wall. Two areas on the south wall feature an iron element that has been cut away.

Documentation

Figures 93-106.

Paint samples
FIIS 13 P004: Interior wall of tower.
FIIS 13 P006: Interior, entry wall, west jamb of arch.
FIIS 13 P017: Interior wall of tower.
FIIS 13 P018: Partition at sixth landing, stairway side (fig. 107).
FIIS 13 P024: Iron T-bar at sixth landing, supporting partition (fig. 108).
FIIS 13 P028: Partition at sixth landing, stairway side.
FIIS 13 P034: Exterior wall, sixth-landing room, where brick is recessed to accommodate stairway (fig. 109).
FIIS 13 P043: Base of Watch Room wall (bottom three courses).
FIIS 13 P047: Watch Room wall, cast-iron vent box (figs. 110-111).

Historical Background

The walls remain as constructed in the tower's cylindrical stairwell. They have been repointed a number of times, as indicated by presence of various mortar types. The walls of the individual rooms (the sixth-landing room, the Service Room, and the Watch Room) have survived with only minor changes. These changes usually related to something that was attached and/or removed from the wall.

No historical documentation exists relating to the five Watch Room vent boxes. They are original and remain in situ. The exterior wall treatment for these vents has been altered, however, presumably dating to the introduction of the concrete coating in 1912. Further investigation is required to determine the historic exterior treatment for these plates.

As mentioned earlier, the square hole cut into the brickwork above one of the Watch Room's vent boxes is thought to be an alteration.



Figure 80. Tower exterior: plinth with ventilation holes (1983).



Figure 81. Tower exterior: plinth, ventilation holes, and anchor (1983).



Figure 82. Tower exterior: west elevation (1982).



Figure 83. Tower exterior: north elevation (1982).



Figure 84. Tower exterior: neck decoration and lantern (1982).

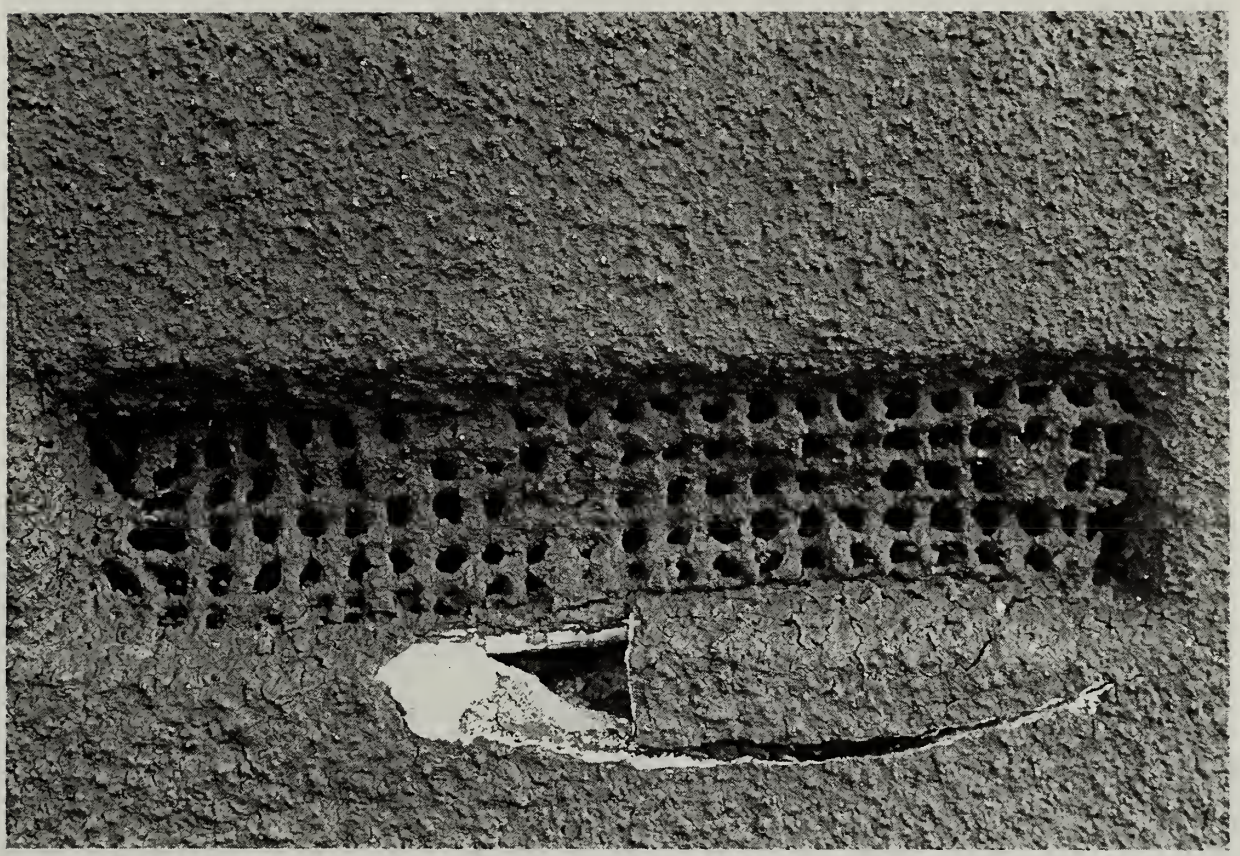


Figure 85. Tower exterior: grate for Watch Room vent box (1983).



Figure 86. Tower exterior: deteriorated coating and exposed brickwork (1982).

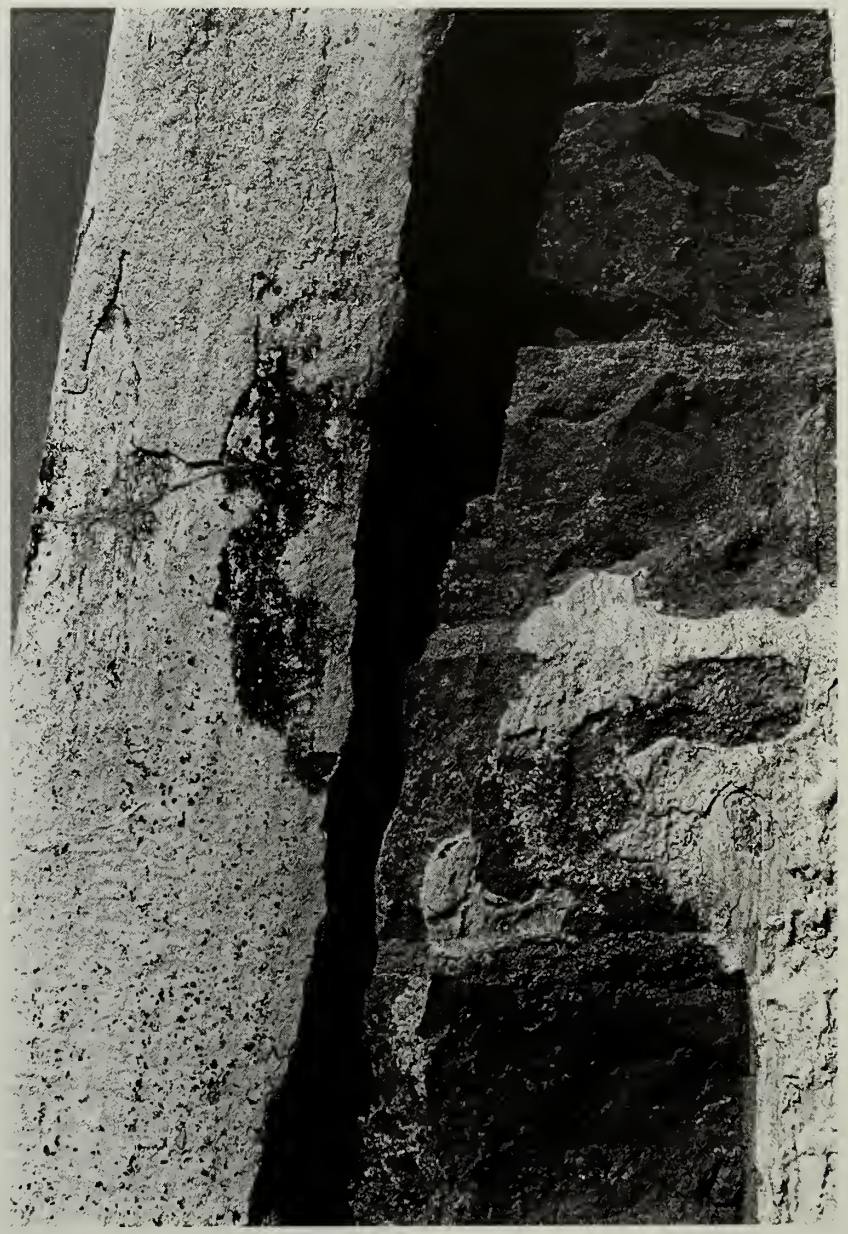


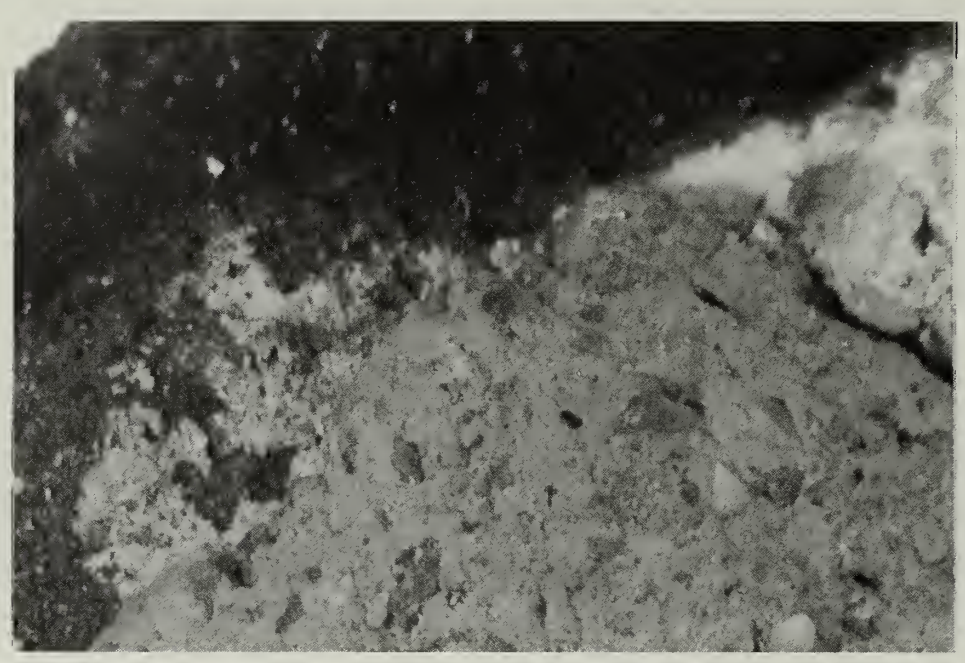
Figure 87. Tower exterior: coating separating from brickwork at entrance doorway (1982).



Figure 88. Tower exterior: deteriorated coating and exposed brickwork at Watch Room (1983).



Figure 89. Tower exterior: protective coating debris at base of tower (1983).

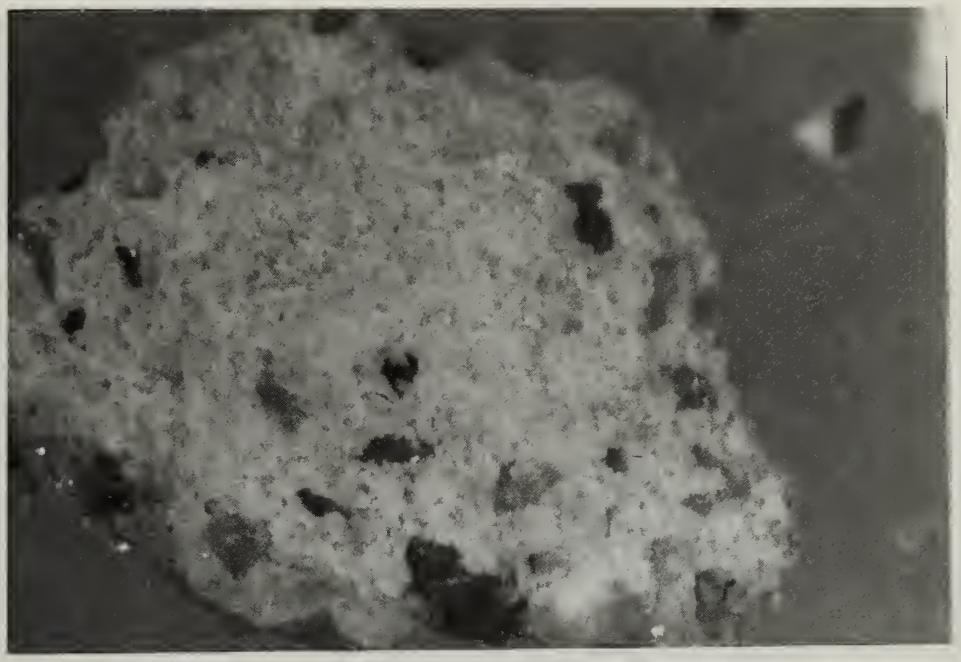


SAMPLE NO.: FIIS 13 P001
LOCATION: Lantern, Earlier Exterior Stucco plus later Asphalt Coating
APPROXIMATE NUMBER OF LAYERS: 5
SUBSTRATE: Brick

CHROMOCHRONOLOGY:

1. Stucco
2. Light yellow cream
3. Dark yellow ochre
4. White
5. Black asphalt
6. Black asphalt

Figure 90. Tower exterior: paint sample FIIS 13 P001, wall covered by coating (1983).



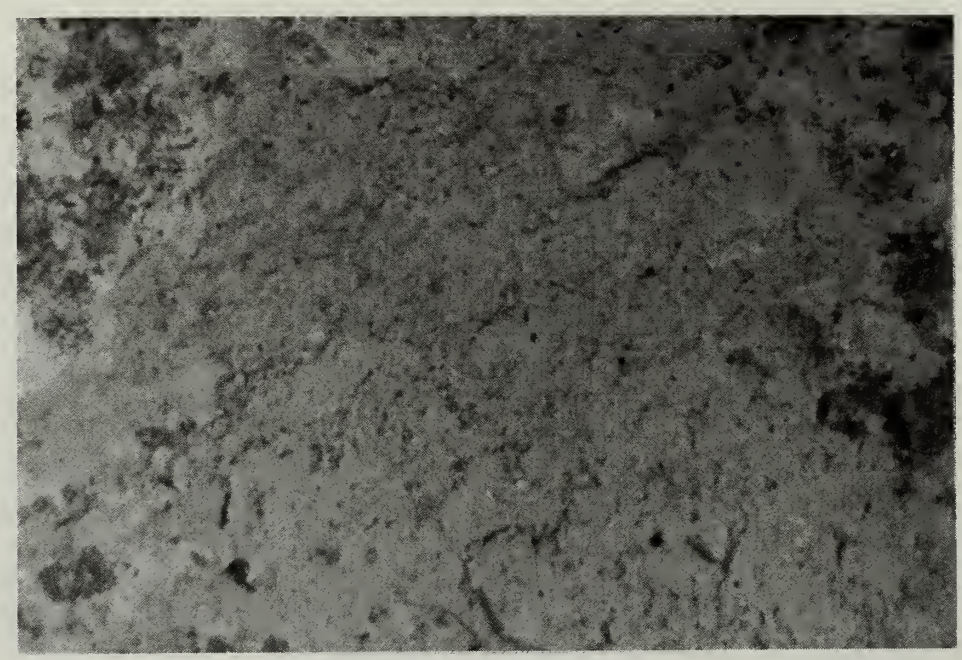
NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P005
LOCATION: Exterior of Lantern, Upper Several Courses of Brick, Not Covered by 1912 Protective Concrete Coating
APPROXIMATE NUMBER OF LAYERS: 1
SUBSTRATE: Brick

CHROMOCHRONOLOGY:

1. Light yellow cream

Figure 91. Tower exterior: paint sample FIIS 13 P005, wall not covered by coating (1983).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P008
LOCATION: Exterior of Tower, Brick Spalled from Tower

APPROXIMATE NUMBER OF LAYERS: 2
SUBSTRATE:

CHROMOCHRONOLOGY:

1. Light yellow cream
2. Dark yellow cream

Figure 92. Tower exterior: paint sample FIIS 13 P008, spalled brick (1983).

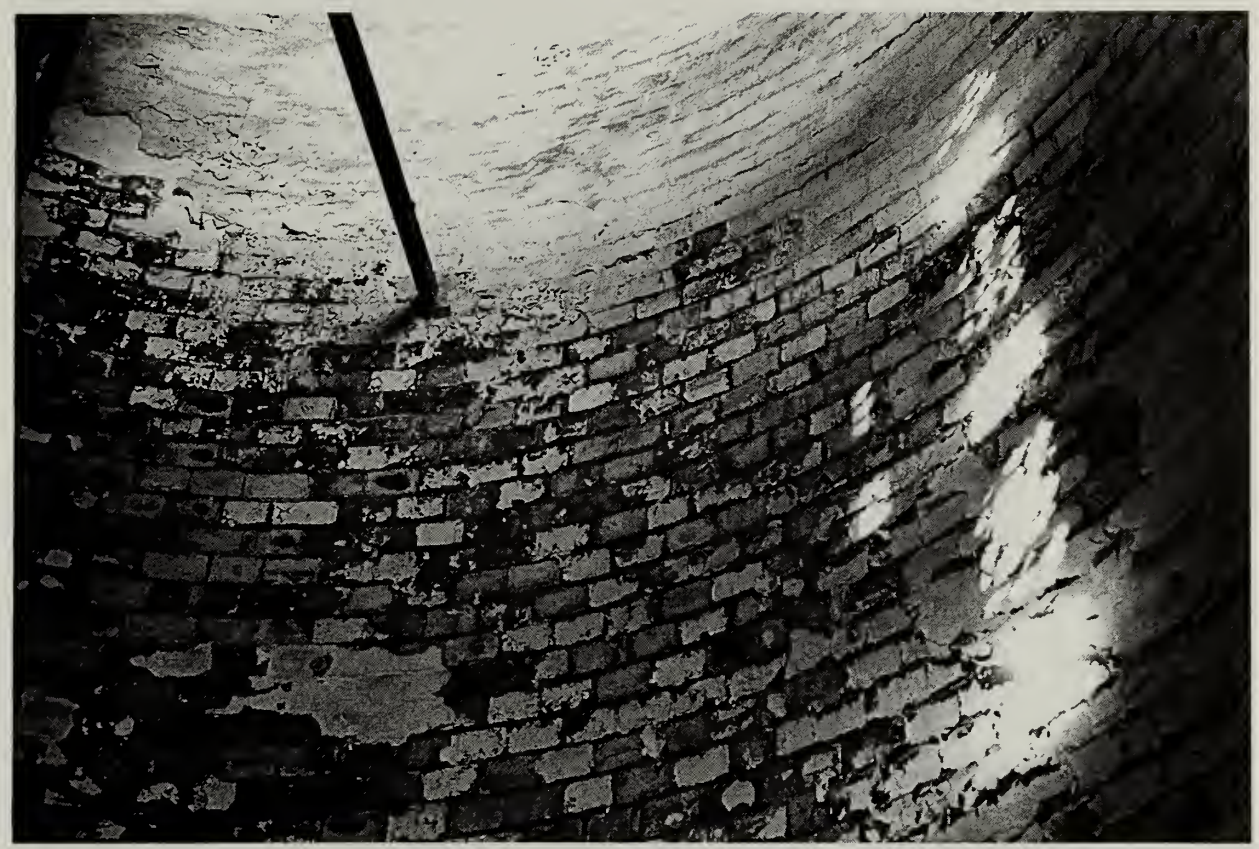


Figure 93. Tower interior: brick wall (1983).



Figure 94. Tower interior: granite cornice in Service Room (1983).



Figure 95. Tower interior: wall ventilation holes at ground level (1983).



Figure 96. Tower interior: wall ventilation slots at upper levels (1983).



Figure 97. Tower interior: brick arch over doorway in sixth-landing room (1983).



Figure 98. Tower interior: typical brick arch over windows (1983).



Figure 99. Tower interior: brickwork around roundels (1983).



Figure 100. Tower interior: Watch Room vent box, open (1983).



Figure 101. Tower interior: Watch Room vent box, closed (1983).



Figure 102. Tower interior: efflorescence of wall brickwork (1983).



Figure 103. Tower interior: deterioration of wall whitewash (1982).



Figure 104. Tower interior: deterioration of wall whitewash (1982).



Figure 105. Tower interior: vertical crack in wall brickwork (1983).

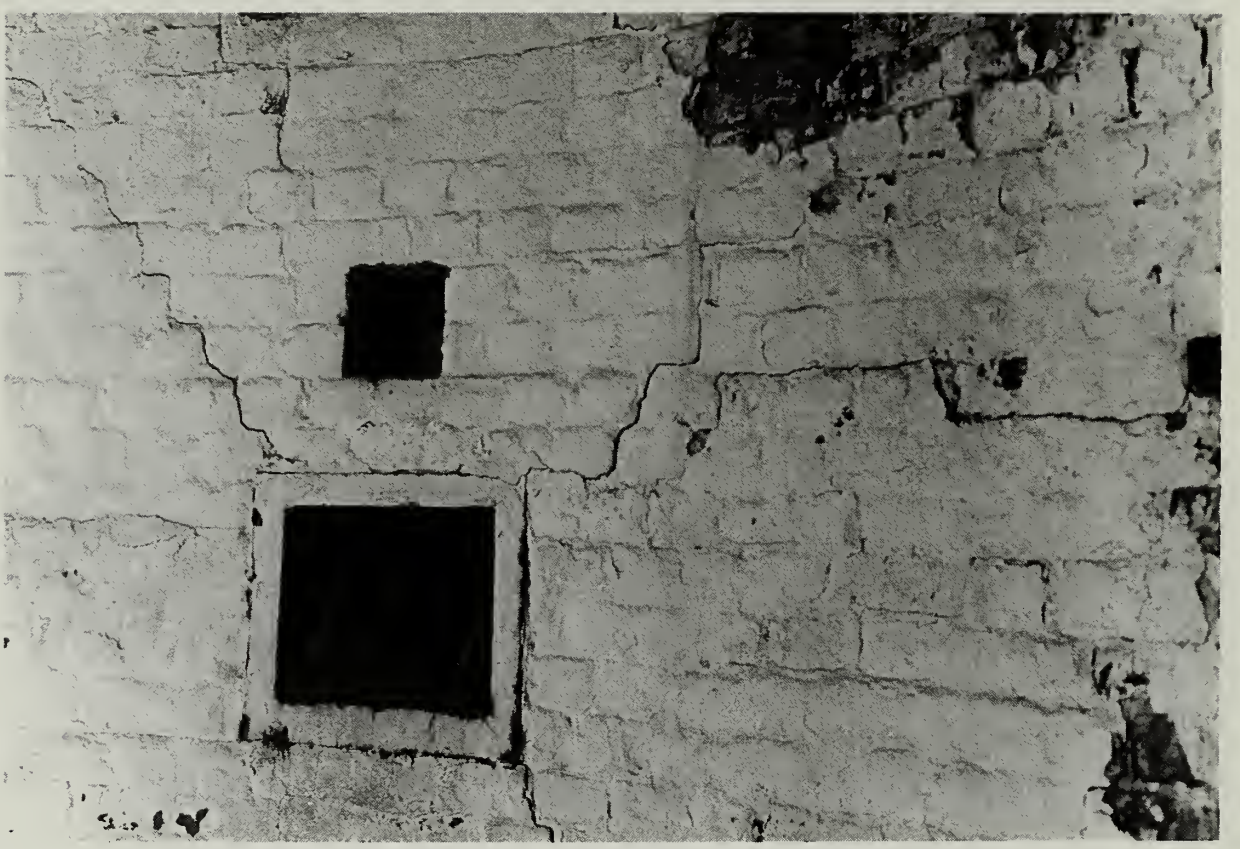
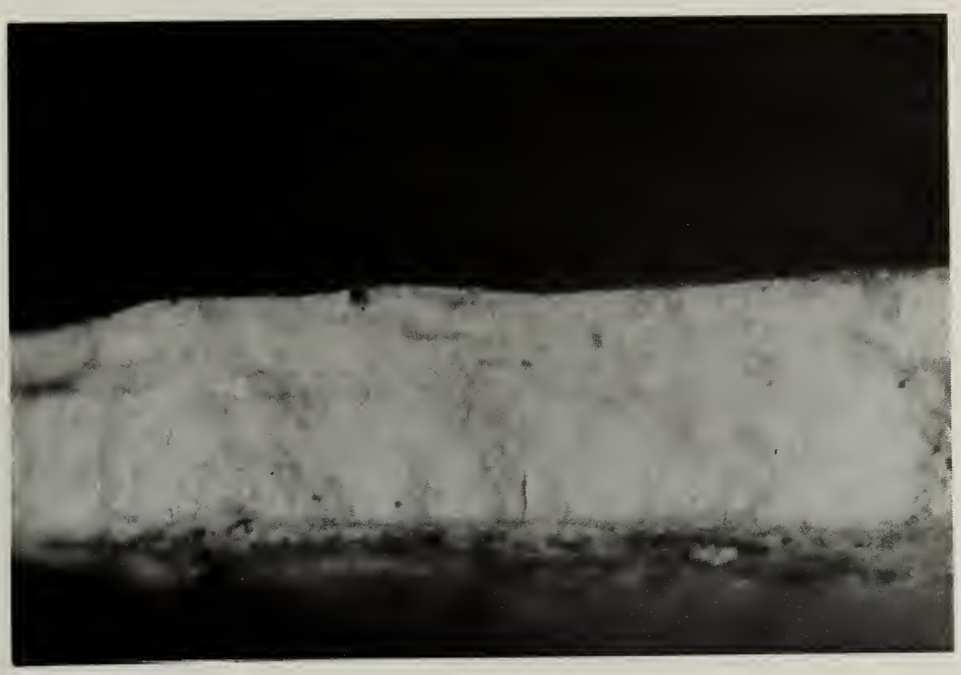


Figure 106. Tower interior: Watch Room, cracks in wall brickwork (1983).



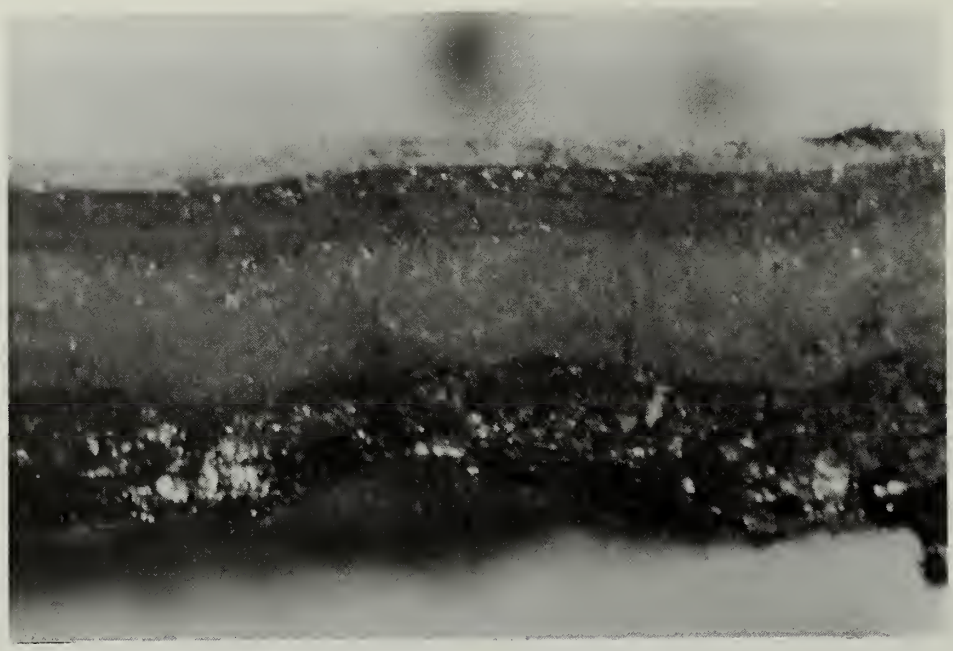
NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P018
LOCATION: Tower Wall at 6th Landing

APPROXIMATE NUMBER OF LAYERS: Difficult to Distinguish
SUBSTRATE: Brick

CHROMOCHRONOLOGY: Whitewash - Numerous Layers

Figure 107. Tower interior: paint sample FIIS 13 P018, wall at sixth landing (1983).



NOT FOR COLOR USE

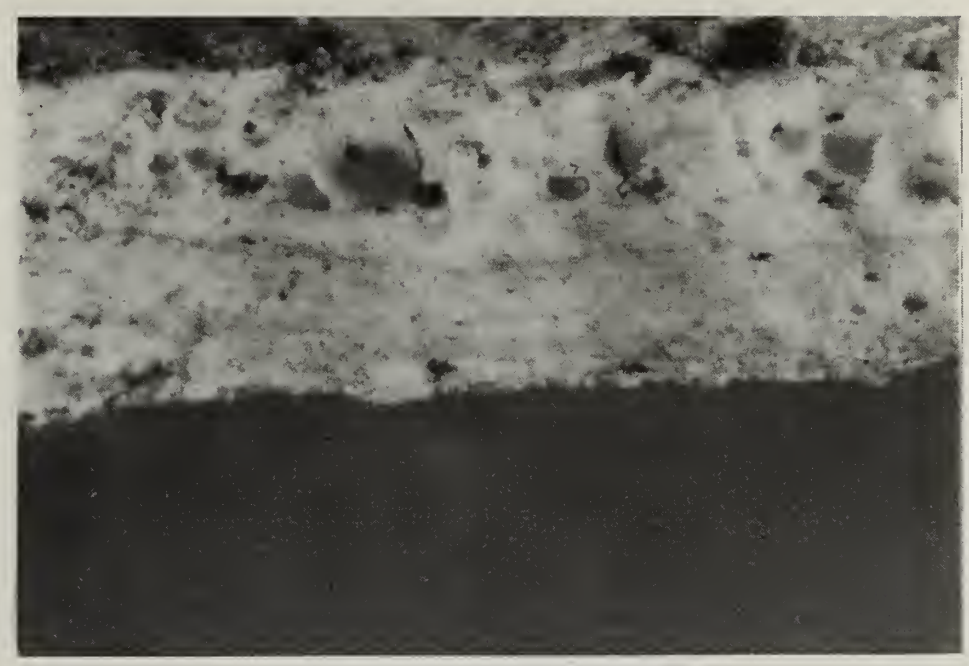
SAMPLE NO.: FIIS 13 P024
LOCATION: Iron T-Bar at 6th Landing, Supporting Brick Interior Wall

APPROXIMATE NUMBER OF LAYERS: 17+
SUBSTRATE:

CHROMOCHRONOLOGY:

1. Black
2. Black
3. Black
4. Black
5. Black
6. Black
7. Black
8. Rust red
9. Orange red
10. Orange red
11. Rust brown
12. Red
13. Rust brown
14. Medium brown
15. Olive green
16. Gray
17. Gray

Figure 108. Tower interior: paint sample FIIS 13 P024, iron bar under partition at sixth-landing room (1983).

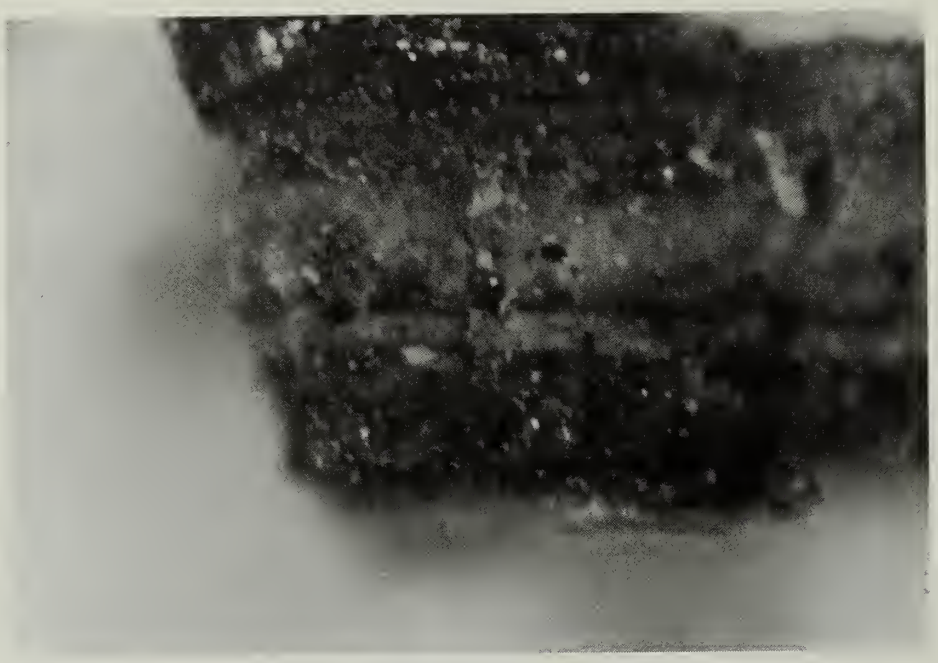


NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P034
LOCATION: 6th Landing Room, Top of Stairs, Area Where Brick is Recessed to Accommodate Stairs
APPROXIMATE NUMBER OF LAYERS: Difficult to Distinguish
SUBSTRATE: Brick

CHROMOCHRONOLOGY: Whitewash - Numerous Layers

Figure 109. Tower interior: paint sample FIIS 13 P034, sixth-landing room wall, area recessed for stairway (1983).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P047
LOCATION: Watch Room, Cast Iron Grate

APPROXIMATE NUMBER OF LAYERS: 14
SUBSTRATE: Metal

CHROMOCHRONOLOGY:

1. Cream
2. Dark blue green
3. Medium green
4. Off white
5. Cream
6. Cream
7. Gray
8. Cream
9. Light blue green
10. Silver
11. Orange red
12. Orange red
13. Medium brown
14. Black

Figure 110. Tower interior: paint sample FIIS 13 P047, Watch Room vent box (1983).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P047
LOCATION: Watch Room, Cast Iron Grate

APPROXIMATE NUMBER OF LAYERS: 14
SUBSTRATE: Metal

CHROMOCHRONOLOGY:

1. Cream
2. Dark blue green
3. Medium green
4. Off white
5. Cream
6. Cream
7. Gray
8. Cream
9. Light blue green
10. Silver
11. Orange red
12. Orange red
13. Medium brown
14. Black

Figure 111. Tower interior: paint sample FIIS 13 P047, Watch Room vent box (1983).

FLOORING

Ground-Level Floor

Description

There is so much debris at the base of the tower interior that it was difficult to study the construction of the floor and its condition. Therefore, the following discussion should be supplemented by additional analysis.

Material Entrance hallway, granite; tower stairwell, concrete slabs.

Dimensions The concrete slabs are 1½ inches higher than the granite; presumably granite or tile (see below) is extant underneath the slabs.

Historical Background

Further investigation is required to determine the original flooring material employed. No reference to this flooring has been located. The 1861 specifications for a "Brick Tower" (App. D-1) includes the following commentary related to the flooring at the ground level: "The passages to, and floor of tower must be paved with encaustic tiles, blue and buff, solidly laid in cement."

Floor of the Sixth-Landing Room

Description

Material Poured concrete. Iron T-bar runs east/west, to support the interior partition wall above.

Finish Painted gray.

This area also requires further investigation.

Documentation

Figures 112.

Paint samples FIIS 13 P024: iron T-bar, supporting interior partition wall (fig. 108).

Historical Background

The poured concrete is a later alteration, because it covers over the bolts that attach the stairway in this room to the floor.

Service Room Floor

Description

Material Wood clad with copper.

Dimensions Joists 3 ¾ inches wide by 5 ¾ inches deep.
Subflooring boards 9½ inches wide by 1 1/8 inches thick (tenon is three-eighths of an inch thick).
Finish flooring boards 10 inches wide by 1¼ inches thick.

Design The floor is constructed of wood, covered with a protective cladding of copper. The wood floor is supported by joists that run north/south, approximately 24 inches on center, through the interior partition wall. The joists rest in the brickwork. The floor is two boards thick.

The subflooring boards run east/west, parallel to the interior partition wall. The boards are tongued and grooved. The finish flooring runs north/south, perpendicular to the subflooring. The wooden floor is covered with 15 wedge-shaped sheets of copper nailed to the floor.

The only openings in the floor are for the central column and the conduits, and for the trapdoor along the west wall.

Finish Painted gray.

Condition The floor is covered with debris and needs painting; otherwise, it is in good condition. Because of high moisture content, the copper cladding should be removed in areas to check the condition of the wood flooring.

Documentation

Figures 113-115.

Paint samples FIIS 13 P036: Service Room, copper floor covering (fig. 116).
FIIS 13 P040: Service Room, floor joists supporting floor.
FIIS 13 P041: Service Room, wood floor (fig. 171).

Historical Background

The wooden flooring in the Service Room is original. The copper sheathing is a replacement. Its date is not known, but is assumed to be after 1894. Figure 66 includes a floor plan of the Service Room that exhibits a stovepipe opening adjacent to the northwest wall. This opening is not extant in the current sheathing. The paint stratigraphy offers possible clues to the relative dates. The wood-flooring finish samples display numerous layers, while the copper sheathing samples exhibit only several layers. The bottom layers in samples from the sheathing appear to be corrosion products, which implies that the copper sheathing was not originally painted.

Watch Room Floor

Description

Material Cast iron.

Dimensions One-half inch thick.

Design The floor consists of six wedge-shaped plates. Their outer, wider edges rest on the single course of bricks that sits on the granite cornice stones that form the upper part of the Service Room's walls. The inner, smaller ends of the plates come together at the center of the room, atop the central column that extends up from the bottom of the tower to the floor of the Watch Room. These plate ends rest on a lip protruding from the column, as do the steps of the main stairway, farther down the column. The wedge-shaped sections are held together underneath by flanges that are secured by three bolts per flange. The flanges are framed into the brickwork, providing additional support. A pedestal stands on the floor and is bolted through the floor; the bolts are visible on the underside, two bolts per floor section.

On the west-southwest side is the opening for the stairway down to the Service Room. At this opening is a piece of wood measuring 4 inches wide by 3 inches deep by 3 feet long that serves as a nailer for the stairway at this level. The cast-iron floor sits on this wood fragment as well. The wood fragment appears to be a former joist, cut off when the cast-iron floor was introduced but maintained as a nailer for the stairway.

The pie-shaped floor castings have been numbered for identification purposes, starting with the stairway opening to the Service Room and moving clockwise. The features of each floor section are as follows:

Section #1 - two bolts for the pedestal; contains the stairway opening.
Section #2 - two pedestal bolts; small opening near wall, close to center.
Section #3 - two pedestal bolts; long rectangular opening at edge of pedestal (designated in figure 66 as an opening for the clockworks); four miscellaneous holes for former bolts; three loops for a rod.
Section #4 - two pedestal bolts; a round hole for a stovepipe, diameter 5¼ inches, with an 8-inch-square plate ghost around it; one opening 9 inches square, covered by a wooden board 11 by 10 inches.

Section #5 - two pedestal bolts; one large bolt.
Section #6 - two pedestal bolts.

The floor is finished with ceramic tiles at the threshold of the doorway from the Watch Room to the lower balcony. The six tiles in this area are octagonal, buff in color and 6½ inches wide. They are set in concrete.

Finish Watch Room floor (surface and underside) painted gray.

Condition The floor retains dampness; it is deteriorated, and some corrosion is evident. Several ceramic tiles at the threshold are cracked.

Documentation

Figures 118.

Paint samples FIIS 13 P042: Watch Room, wood fragment at top of stairway (fig. 119).
FIIS 13 P051: Watch Room, floor.
FIIS 13 P052: Watch Room, floor, wooden board.

Historical Background

The extant Watch Room floor can not be precisely dated; presumably the date falls between 1880 and 1894. The original floor appears to have been constructed of wood, as implied by both existing physical evidence and documentary data. Form 36, prepared in March 1880 (App. C-86), describes the Watch Room floor as a "wooden floor, copper covered." An 1876 monthly report notes the Watch Room floor as being resheathed. By 1894, the drawings describe the floor as being of iron. Figure 68 is a drawing entitled "Modifications of Tower. Castings of Watch Room Floor," dated July 24, 1894. The drawing does not represent the floor as it exists; the earlier figure 66, dated January 1894, is a more accurate representation of the floor. Presumably the intent was to replace the floor because of the proposed change in the light apparatus. Since the plan to alter the light was withdrawn, the floor was not replaced.

The current openings in the floor reflect those designated in figure 66. This figure provides data on the method of attachment for the fourth-order lantern platform that was installed on the Watch Room balcony. The monthly report for August 1888 (App. C-85) made reference to the "tower deck" having been pointed.

Lantern Floor

Description

Material Cast iron.

Dimensions Peripheral floor half an inch thick.
Center plate one-quarter of an inch thick.
Flanges five-eighths of an inch thick.

Design This floor consists of two parts: an inner, circular plate dating from ca. 1932, when the extant light pedestal was installed, and an outer ring of flooring dating to the 19th century, presumably original. The floor of the upper balcony is an extension of this earlier flooring.

The inner plate is in two sections, being divided along the north/south axis. The pedestal is bolted to it in four places. The floor pattern features raised, elongated diamonds 2½ inches long. A note on figure 70 states: "use ch'kd. Floor PL. taken from Shinnecock."

The outer floor is in 16 sections, corresponding to the other features of the lantern. These sections extend out from the inner plate, running underneath the lantern walls to form the deck of the upper balcony. The 16 sections are joined together by flanges along their bottom edges; the flanges are bolted to each other with one bolt at either end. They are also held together by the brickwork of the Watch Room's walls, which extends up around the flanges, to the underside of the sections. The depth of the flanges increases with distance from the inner plate. The upper surfaces of the sections exhibit raised squares five-sixteenths of an inch in size. These squares become larger with distance from the inner plate, reaching a dimension of three-quarters of an inch at the perimeter of the upper balcony. The edges of the sections that abut the inner plate feature a lip to accommodate that plate.

There are three openings in the lantern floor: one for a stovepipe, 5¼ inches diameter: one for the light-apparatus pedestal; and one for the stairway along the east-southeast wall. The stairway hole is formed by the omission of the inner part of two sections. These sections thus extend only from the outer edge of the stairway hole out to the upper balcony. One opening exists in the upper balcony deck for the ladder ascending from the lower balcony. At the southwest corner of the opening is a break in the plate, which has been repaired.

Finish Lantern floor (surface and underside) painted gray.
Upper balcony deck painted black; underside exhibits asphalt coating.

Condition The floor appears to be structurally sound and in good condition; however, it collects water and is full of dirt, debris, and paint chips.

Documentation

Figures 120-122, 201.

Paint samples FIIS 13 P056: lantern, early floor.
FIIS 13 P057: lantern, pedestal floor (fig. 123).
FIIS 13 P058: lantern, pedestal floor, from Watch Room (fig. 124).
FIIS 13 P059: lantern, early floor, from Watch Room.

Historical Background

The lantern floor dates from two major periods of work: the 16 outer sections (the peripheral floor and upper balcony deck) are original, while the interior plate, which is associated with the existing light apparatus, dates to ca. 1932-1933. Figure 62, dating to 1871, provides a drawing of a lantern floor very similar to that at Fire Island. Form 36, prepared in March 1880 (App. C-86), describes the floor of the lantern as copper on the inside and cast iron on the outside. Confusion exists regarding the copper reference. It may refer to a flooring that was related to the Fresnel lens. The 1894 drawings illustrate the lantern floor as being of iron (figs. 63, 67). The latter floor plan shows the openings identical to those that survive today.

The inner flooring, related to the existing light pedestal, is drawn in figure 70. A note on the drawing states: "use ch'kd Floor Pl. taken from Shinnecock." The date of this figure is September 20, 1932.

Trapdoors

Description

There are openings suitable for trapdoors in the floors of the Service Room, Watch Room, and lantern. These openings are at the outer edges of the floors; they are connected by short stairways that will be described shortly. The only opening that actually has a trapdoor at this time is the opening in the floor of the Service Room.

Material Wood, with copper cladding on the upper surface and sides.

Design A trapdoor was originally designed for this location, as evidenced by the two courses of wall brick omitted to create a recess to support the trapdoor. The door is constructed of three boards running parallel to the wall; the underside has chamfered battens nailed perpendicularly to the boards. The door is hinged on the wall side and opens upward. Its butt hinges are 3 inches long with side plates 1 inch wide. A felt weather-strip has been installed along this edge. The upper surface of the door has been sheathed with copper sheeting. This metal covering consists of two sections, with a splice in the center, running parallel to the battens underneath. The trapdoor is operated by a drop-ring handle with rope attached. This handle is located on the upper side of the trapdoor.

Finish Painted gray.

Condition Warped, does not close; paint is chipped on wood and metal. Wood and metal in good condition otherwise.

There is no evidence for a trapdoor in the opening in the floor of the Watch Room. However, there is evidence for the existence of a trapdoor in the opening in the floor of the lantern. This evidence is found on both the stairway and the flooring.

Documentation

Figures 125-127.

Paint samples FIIS 13 P037: Service Room, trapdoor, underside.

Historical Background

To arrive at a specific date for the current trapdoor requires additional investigation. The door is of the appropriate historic design. It appears to still carry its original hardware as well.

Concerning the trapdoor missing from the opening in the floor of the lantern, the Form No. 36–prepared in March 1880–described the trapdoor in this location as being of wood lined with copper. When this door was removed is not known.



Figure 112. Tower interior: underside of sixth-landing room floor (1983).



Figure 113. Tower interior: underside of Service Room floor, inside sixth-landing room (1983).



Figure 114. Tower interior: underside of Service Room floor, inside main stairwell ((1983).



Figure 115. Tower interior: Service Room floor (1983).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P036
LOCATION: Service Room - Floor, Copper Covering

APPROXIMATE NUMBER OF LAYERS: 5+
SUBSTRATE: Metal

CHROMOCHRONOLOGY:

1. Copper green stain
2. Light pink (paint or corrosion?)
3. Brown
4. Orange
5. Gray green
6. Gray

Figure 116. Tower interior: paint sample #FIIS 13 P036, copper on Service Room floor (1983).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P041
LOCATION: Service Room - Wooden Floor

APPROXIMATE NUMBER OF LAYERS: 27+
SUBSTRATE: Wood

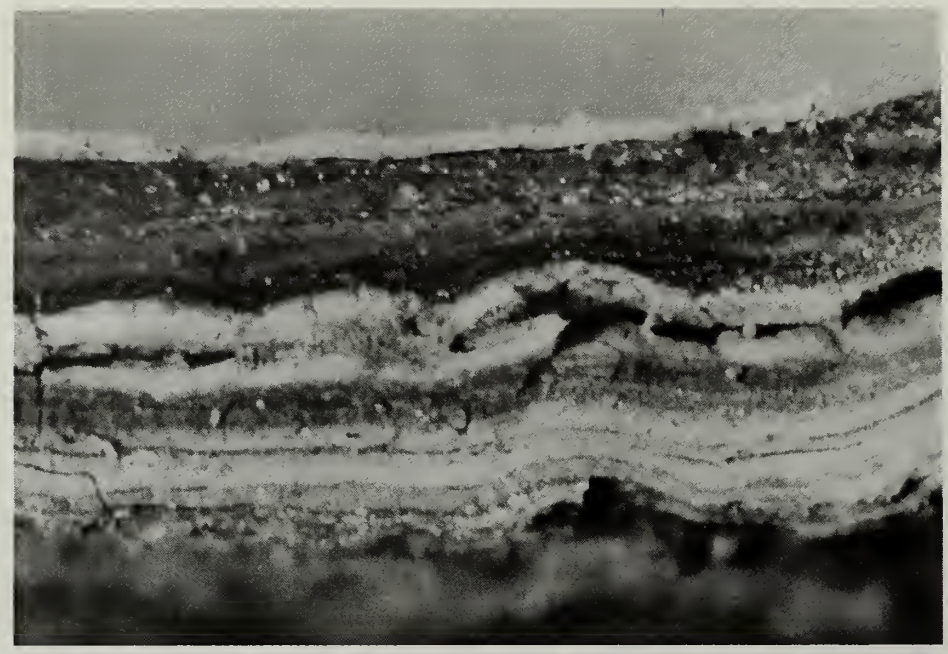
CHROMOCHRONOLOGY:

1. Off white
2. Gray
3. Gray
4. Light orange
5. Gray
6. Off white
7. Off white
8. Slate gray
9. Slate gray
10. Off white
11. Off white
12. Off white
13. Off white
14. Off white
15. Off white
16. Off white
17. Off white
18. Off white
19. Off white
20. Rust brown
21. Dark green
22. Rust brown
23. Rust red
24. Medium brown
25. Orange
26. Gray
27. Gray

Figure 117. Tower interior: paint sample #FIIS 13 P041, wood of Service Room floor (1983).



Figure 118. Tower interior: Watch Room floor, threshold of doorway to lower balcony (1982).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P042
LOCATION: Watch Room, Wood at Top of Stairs from Service Room

APPROXIMATE NUMBER OF LAYERS: 31
SUBSTRATE: Wood

CHROMOCHRONOLOGY:

1. Gray
2. Gray
3. Gray
4. Gray
5. Gray
6. Gray
7. Medium green
8. Gray
9. Orange peach
10. Medium green
11. Gray
12. Light green
13. Light green
14. Light green
15. Off white
16. Off white
17. Gray
18. White
19. White
20. Black
21. Black
22. Rust brown
23. Red
24. Silver
25. Gray
26. Silver
27. Red
28. Rust brown
29. Medium brown
30. Grayish green
31. Gray

Figure 119. Tower interior: paint sample #FIIS 13 P042, wood where Service Room stairway reaches Watch Room (1983).

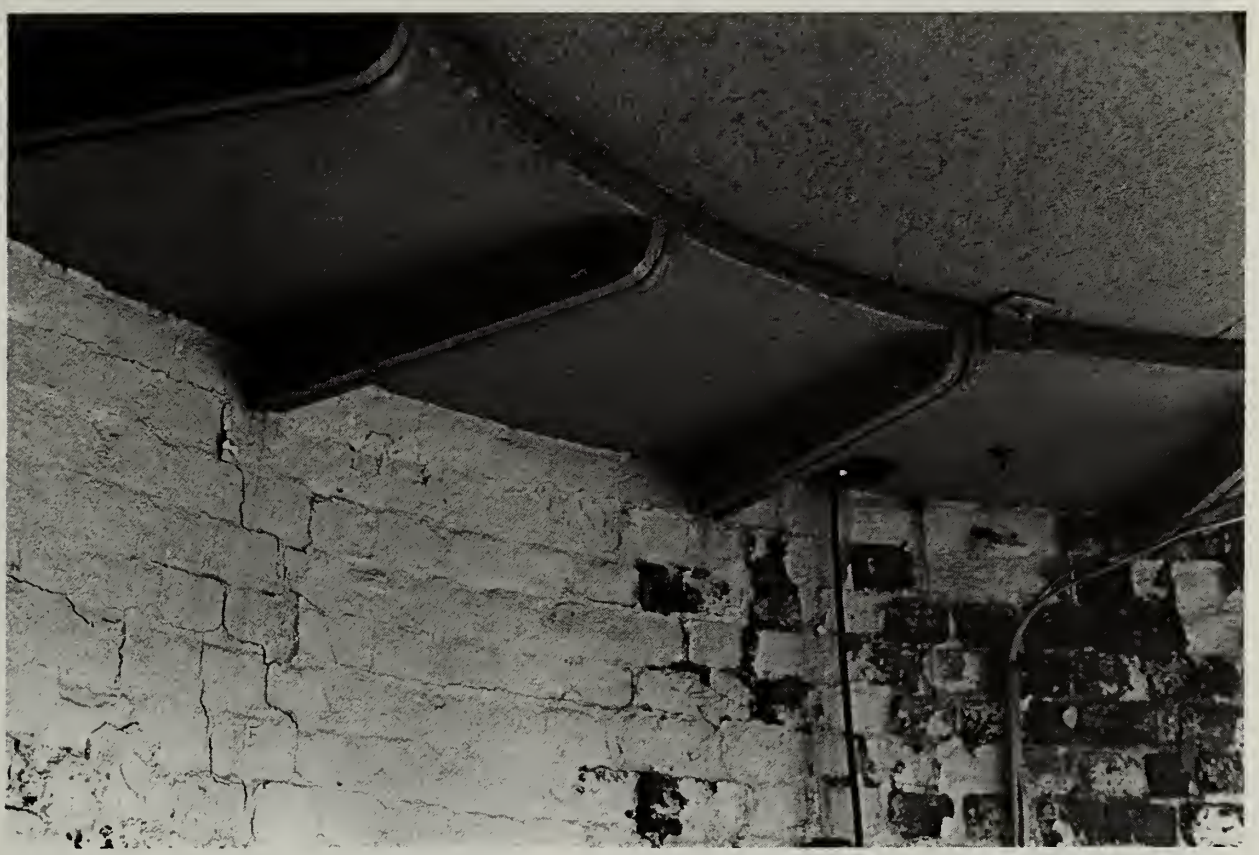


Figure 120. Tower interior: underside of lantern floor, inside Watch Room (1983).

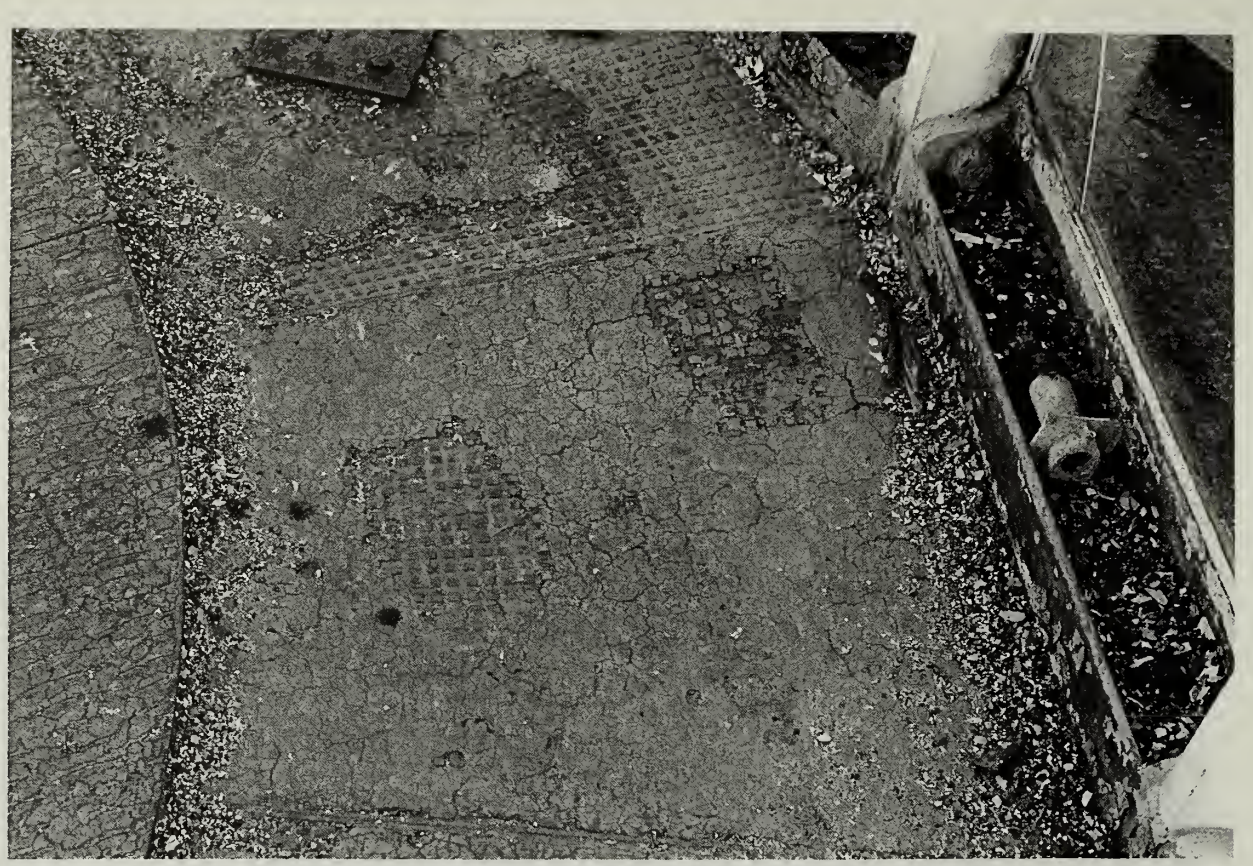


Figure 121. Tower interior: peripheral flooring of lantern (1983).

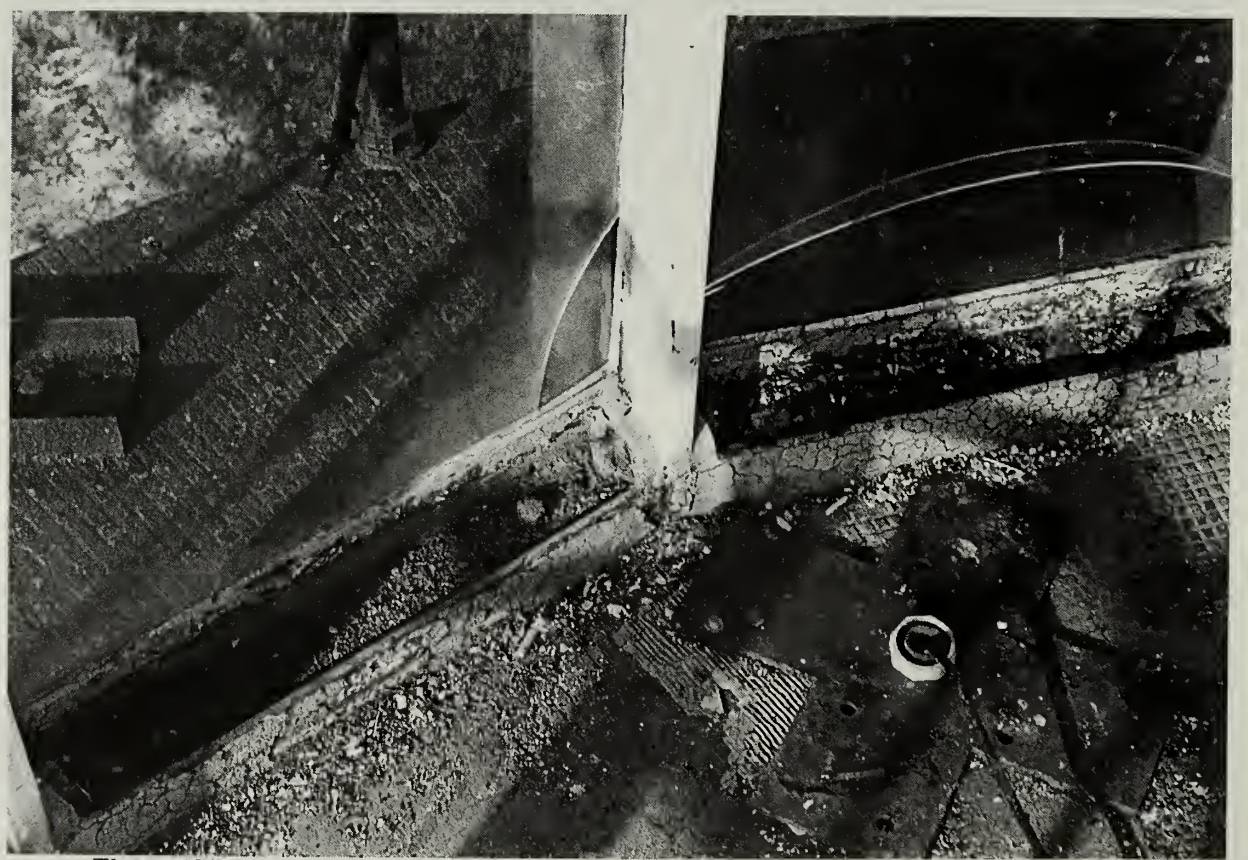


Figure 122. Tower interior: peripheral flooring of lantern and deck of upper balcony (1982).



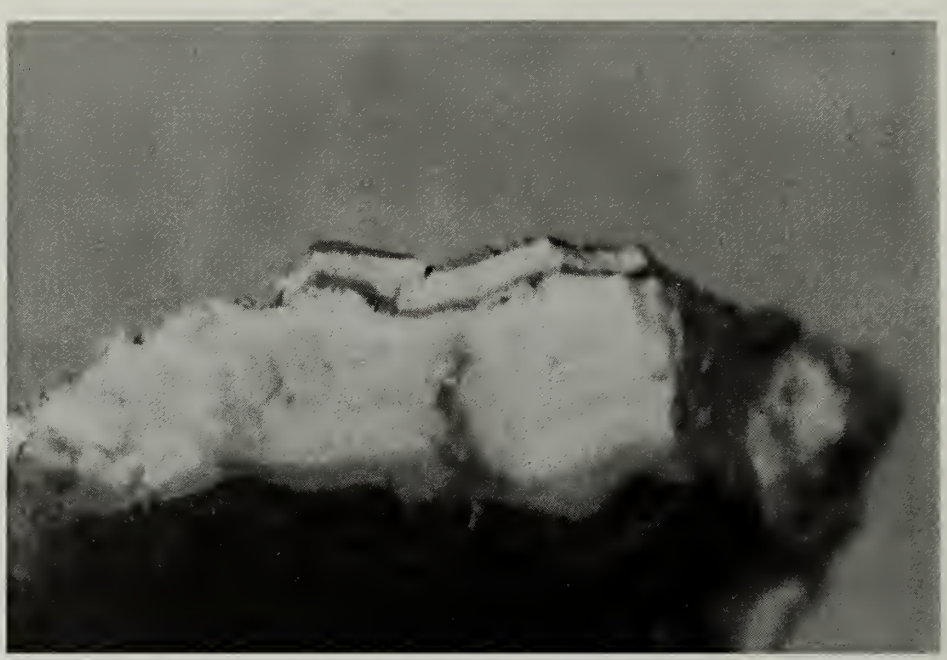
SAMPLE NO.: FIIS 13 P057
LOCATION: Lantern, 1930's Floor

APPROXIMATE NUMBER OF LAYERS: 18
SUBSTRATE: Metal

CHROMOCHRONOLOGY:

1. Orange
2. Rust brown
3. Rust red
4. Rust red
5. Rust red
6. Rust red
7. Rust red
8. Rust red
9. Red
10. Rust brown
11. Black
12. Black
13. Black
14. Orange
15. Medium brown
16. Medium brown
17. Gray green
18. Gray

Figure 123. Tower interior: paint sample #FIIS 13 P057, center floor plate of lantern (1983).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P058
LOCATION: Lantern, Floor - From Watch Room Side

APPROXIMATE NUMBER OF LAYERS: 19
SUBSTRATE: Metal

CHROMOCHRONOLOGY:

1. Rust brown
2. Rust brown
3. Rust brown
4. Black
5. Orange
6. Cream white
7. Cream white
8. Cream white
9. Cream white
10. Cream white
11. Cream white
12. Cream white
13. White
14. White
15. Gray
16. White
17. White
18. White
19. Gray

Figure 124. Tower interior: paint sample #FIIS 13 P058, underside of lantern floor (1983).



Figure 125. Tower interior: opening and trapdoor in Service Room floor (1983).



Figure 126. Tower interior: opening in lantern floor (1982).



Figure 127. Tower interior: opening in lantern floor, traces of former trapdoor (1982).

STAIRWAYS

Main Stairway in Tower

Description

Location Interior of tower, from ground level to the floor of the sixth-landing room. A cast-iron column in the center of this space serves as a newel for the main spiral stairway.

Material Wrought-iron girders and bolts; cast-iron treads.

Dimensions
Stair treads 1 inch thick by 57 inches long by 20 inches wide (at wall) and 8 inches wide (at column).
Stair tread hexagonal openings five-eighths of an inch thick by 1½ inches in diameter.
Stair tread girders one-half inch thick by 2¼ inches deep by 57 inches long.
Landing plates 64 inches (at wall); approximately 10 inches wide (at column).
Landing girder 2¼ inches deep by 1 inch thick by 57 inches long.

Design The spiral stairway is an integral feature to the structure, being tied into the masonry wall. The central column features ring-like protrusions every 7 inches. The step girders are designed in one piece, somewhat like a hairpin; they wrap around the column just above the rings, and their ends extend as two straight rods into the brick walls of the tower. The stair treads rest on these rods. One long bolt holds each pair of ends together close to the column.

The step treads are one cast piece, narrower at the inside face of the column and wider at the wall face. They display a pattern of hexagonal openwork, to allow light to filter through to the lower levels.

The landing girders are larger than the step girders. Each one extends all the way across the interior of the tower, framing into the brick wall at opposite ends. A semicircular bend in the middle of each girder circumvents the central column to one side. A metal strap goes around the other side of the column, and is bolted to the girder. The landing girders are necessary, because the landings' floors consist of two plates. The outer edges of these two plates are supported by the step girders of the adjacent steps, but the inner joint between the two plates needs the support of the landing girder. The landing plates exhibit the same pattern of openwork found on the steps.

Finishes Column and stairway painted gray.

Condition The stairway appears to be structurally sound, with several minor problems. At ground level, the bottom tread is cracked in half down the middle. Landing treads are loose, particularly at landings #2, #4, and #5. Some of the girders are corroded where they are framed into the wall. A further, more detailed survey should be made of all the girders at their junction with the wall.

All finishes are deteriorated–flaking and peeling throughout, exposing the metal–particularly below the fourth landing.

Documentation

Figures 128-136.

Paint samples FIIS 13 P010: main stairway (fig. 137).
FIIS 13 P011: main stairway.

Historical Background

The main stairway in the tower is original and has survived completely intact.

Main Stairway's Safety Line

Description

Material Rope threaded through cast-iron anchors.

Dimensions Diameter, 1¼ inches.
Depth, 1 inch.
Distance from wall, 3 inches.

Design 47 cast-iron anchors are set into the brick tower wall. These anchors are simply tubular elements at the end of a rod that is anchored into the wall. The rope is looped continuously through the tubular openings, forming a safety line.

Number of Anchors Eight from ground to landing #1
Eight from landing #1 to landing #2
Eight from landing #2 to landing #3
Eight from landing #3 to landing #4
Eight from landing #4 to landing #5
Seven from landing #5 to landing #6

Finish Anchors whitewashed, but most have lost their finish.

Condition Stable and in good condition; the rope at ground level requires tightening.

Documentation

Figures 129, 138.

Historical Background

The annual report for 1891 (App. C-94) noted that "the interior of the tower needs a hand railing to staircase." Exactly what was meant by this statement is not known. Perhaps no handrail was installed during construction, and this was to be the first railing; alternatively, the railing may have simply required replacement. Neither the wall surface nor the stairway offer any evidence for a railing earlier than that which remains today.

Stairway in Sixth-Landing Room

Description

Location The stairway runs in a straight line along the west wall of the tower, up to the Service Room.

Material Wrought iron and wood.

Dimensions Treads approximately 1¾ inches thick; 7½ inches wide at wall; 5¼ inches wide at inside edge; 9-inch span between treads.

Design The stairway features two wrought-iron stringers that exhibit a slight curve, following the curve of the exterior tower wall. Each stringer consists of a straight bar with a continuous serrated piece bolted to it. The horizontal parts of the serrated piece support 13 wooden treads that are bolted to the piece. The bolts holding the foot of the stairway to the floor of the sixth-landing room are not visible, because the later concrete floor here has covered them. There is no handrail for this stairway.

Finish Wrought-iron elements and wood treads painted gray.

Condition Appears structurally sound, with several worn steps and deteriorated paint film.

Documentation

Figures 139-140.

Paint samples FIIS 13 P033: stairway in sixth-landing room, against wall at top riser of stairway (fig. 141).
FIIS 13 P034: stairway in sixth-landing room, area where brick is cut away to accommodate stairway (fig. 109).

Historical Background

The stairway from the sixth-landing room to the Service Room is thought to be original. No historical documentation has been located that offers insight into the history of this stairway, so further investigation of the physical fabric will be necessary.

Stairway in Service Room

Description

Location Along the west-southwest wall, ascending to the Watch Room.

Material Wrought iron and wood.

Dimensions Treads approximately $1^{5}/_{8}$ inches thick; 8 inches wide at wall; 5 inches wide at inside edge. 9-inch span between treads.

Design The stairway here is nearly identical to the one in the sixth-landing room. It has only 11 wooden treads, and its head is secured to the floor of the Watch Room in a different manner than that used to secure the head of the sixth-landing room stairway to the floor of the Service Room. The method in which the foot of this stairway is bolted to the floor of the Service Room is clearly visible. It is likely that the foot of the stairway in the sixth-landing room, now hidden beneath the later concrete, was attached similarly.

Finish Wrought-iron elements and wooden treads painted gray.

Condition Several steps are worn; the foot where bolted into the floor is corroded.

Documentation

Paint samples FIIS 13 P039: Service Room stairway, metal framing.

Historical Background

Similar to the stairway in the sixth-landing room, this stairway is thought to be original and largely unaltered. However, the way in which it is secured to the floor of the Watch Room differs from the way the stairway in the sixth-landing room is attached to the floor of the Service Room. The difference is thought to date from the ca.-1890 change in the floor of the Watch Room.

Stairway in Watch Room

Description

Location Along the east wall, ascending to the lantern.

Material Iron.

Dimensions Treads are approximately 1 inch thick; 5½ inches wide at wall; and $4^{3}/_{8}$ inches wide at narrowest point.

Design The Watch Room stairway features eight treads and open risers. The treads are set into the brick exterior wall. There is a stringer only on the west side. The stringer is not continuous, but consists of rods that are bolted through the top of each tread, and through the bottom of the tread below. The treads flare out to allow for these two bolts. The nosing of the top tread has two holes of unknown origin. An element framed into the stairway at the lantern floor level presumably served as a connection for the trapdoor. Visible at the head of the stairway, embedded in the exterior brick wall, are the ends of the paired flanges that support the two floor sections whose inner halves had to be omitted to create the stairway openings.

Finish Painted gray.

Condition Paint is peeling, but there are no clear signs of corrosion. The stairway appears to be structurally sound, with some evidence of repainting work where the treads are framed into the tower wall.

Documentation

Figures 142-143.

Paint samples FIIS 13 P045: Watch Room stairway (fig. 144).

Historical Background

The stairway from the Watch Room to the lantern is hypothesized to be original. The only reference to this stairway is found in an 1894 drawing (fig. 66). Displayed in the drawing is a detail similar to the extant stair-tread design.

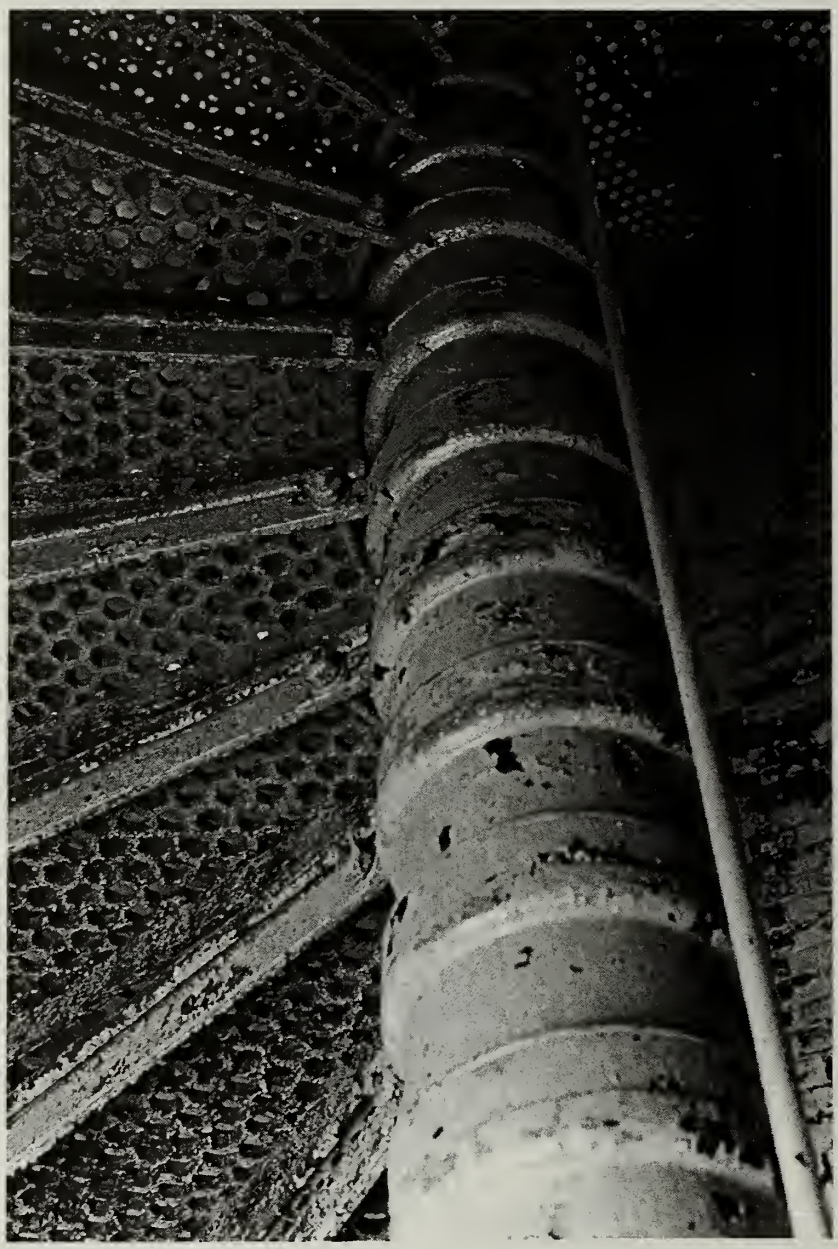


Figure 128. Tower interior: underside of main stairway (1983).

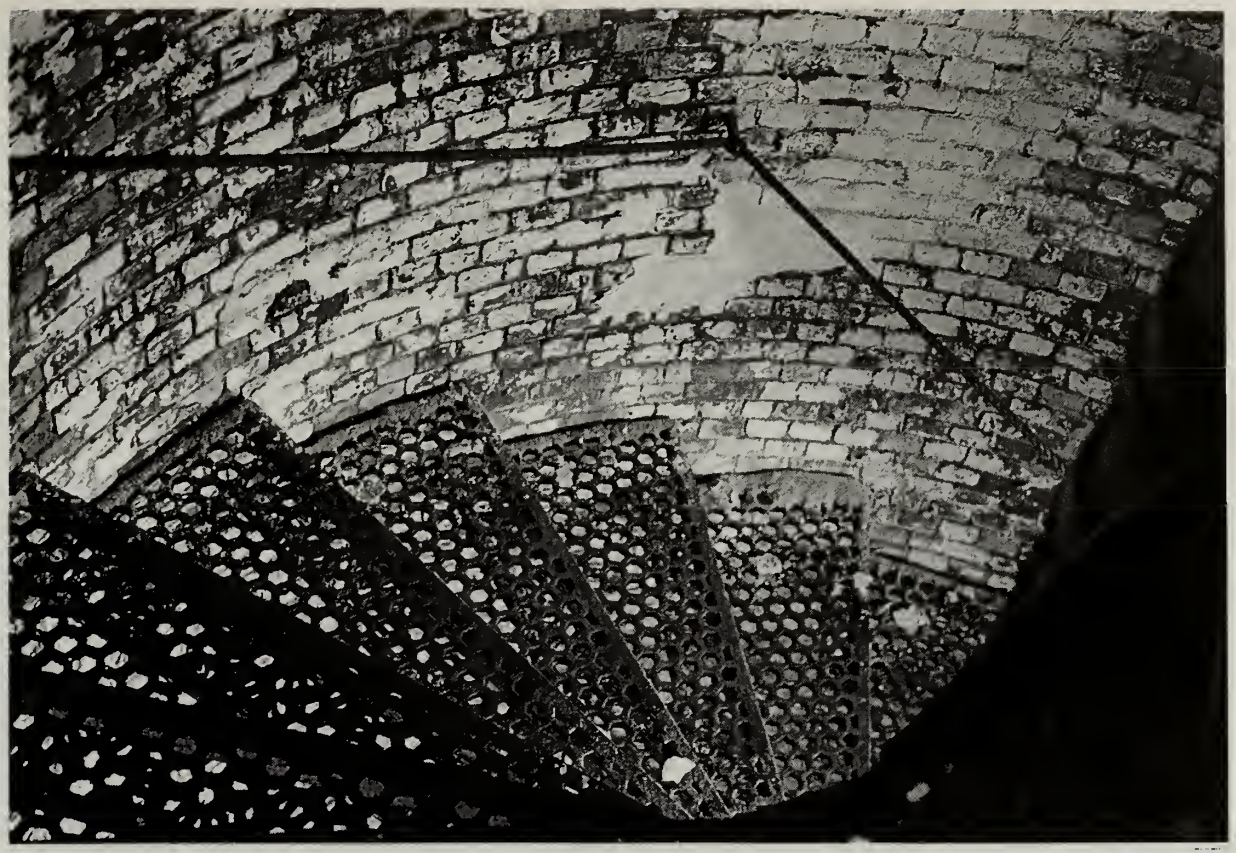


Figure 129. Tower interior: main stairway (1983).



Figure 130. Tower interior: underside of main stairway (1983).

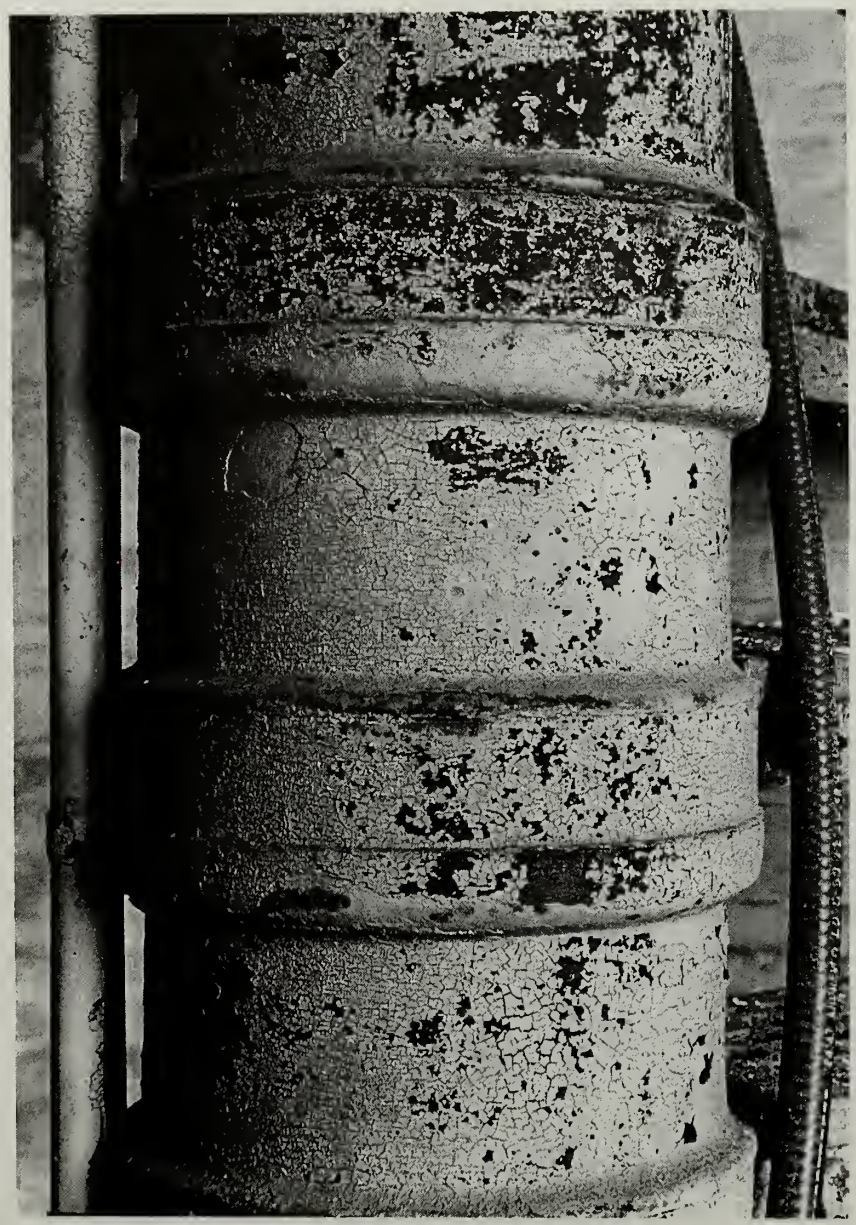


Figure 131. Tower interior: central column (1983).



Figure 132. Tower interior: juncture of stairway treads with central column (1982).



Figure 133. Tower interior: main stairway, girder of landing (1983).

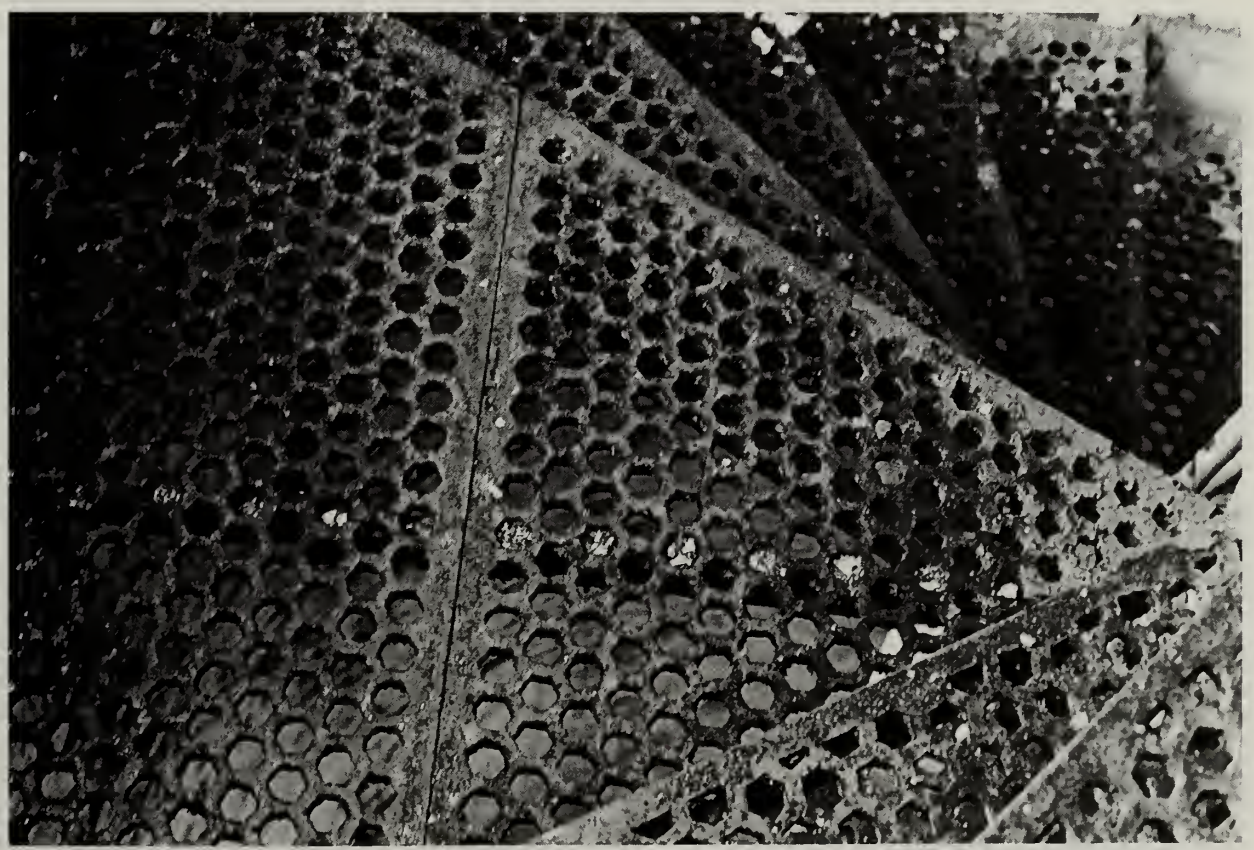


Figure 134. Tower interior: main stairway, landing (1983).



Figure 135. Tower interior: main stairway, deterioration of steps (1983).



Figure 136. Tower interior: main stairway, deterioration of paint (1983).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P010
LOCATION: Tower Stair

APPROXIMATE NUMBER OF LAYERS: 23+
SUBSTRATE: Metal

CHROMOCHRONOLOGY:

1. Rust (metal)
2. Black
3. Olive green
4. Olive green
5. Black
6. Black
7. Black
8. Black
9. Black
10. Black
11. Black
12. Black
13. Black
14. Rust red
15. Orange red
16. Orange red
17. Rust brown
18. Orange red
19. Rust brown
20. Medium brown
21. Off white
22. Gray
23. Gray

Figure 137. Tower interior: paint sample #FIIS 13 P010, main stairway (1983).



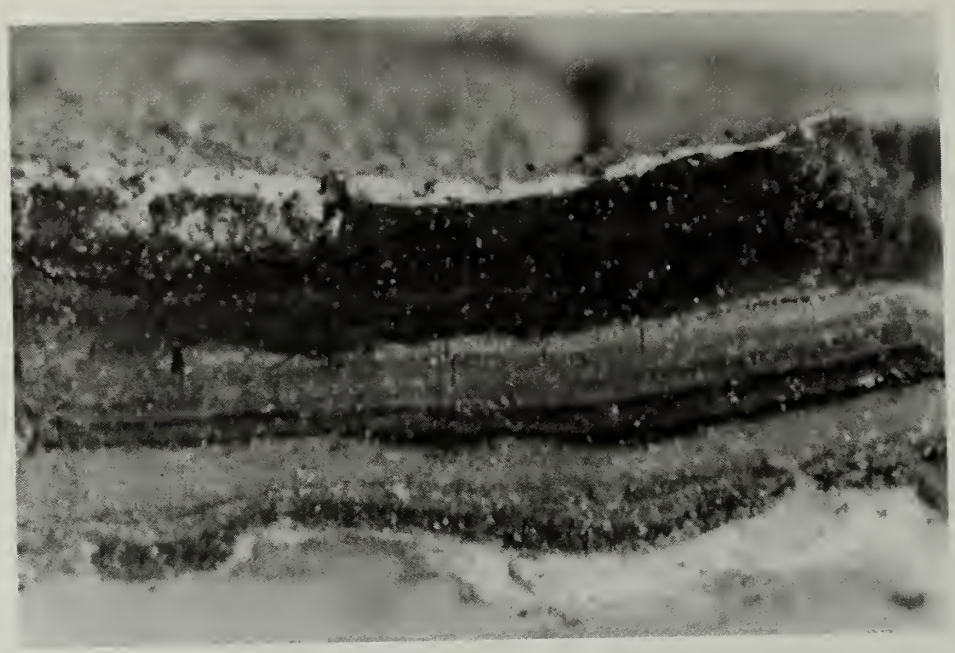
Figure 138. Tower interior: main stairway, safety-line anchor (1983).



Figure 139. Tower interior: stairway in sixth-landing room (1983).



Figure 140. Tower interior: detail of stairway in sixth-landing room (1983).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P033
LOCATION: Stair at 6th Landing Room - Against the Wall at Top Riser of Stair
APPROXIMATE NUMBER OF LAYERS: 31+
SUBSTRATE: Brick

CHROMOCHRONOLOGY:

1. Whitewash
2. Slate gray
3. Gray
4. Gray
5. Yellowish white
6. Yellowish white
7. Gray
8. Gray
9. Gray
10. Gray
11. Black
12. Gray
13. Gray
14. Slate gray
15. Gray
16. Gray
17. Gray
18. Gray
19. Gray
20. White
21. White
22. Off white
23. Rust red
24. Rust red
25. Dark green
26. Dark green
27. Rust red
28. Red
29. Rust brown
30. Medium brown
31. White

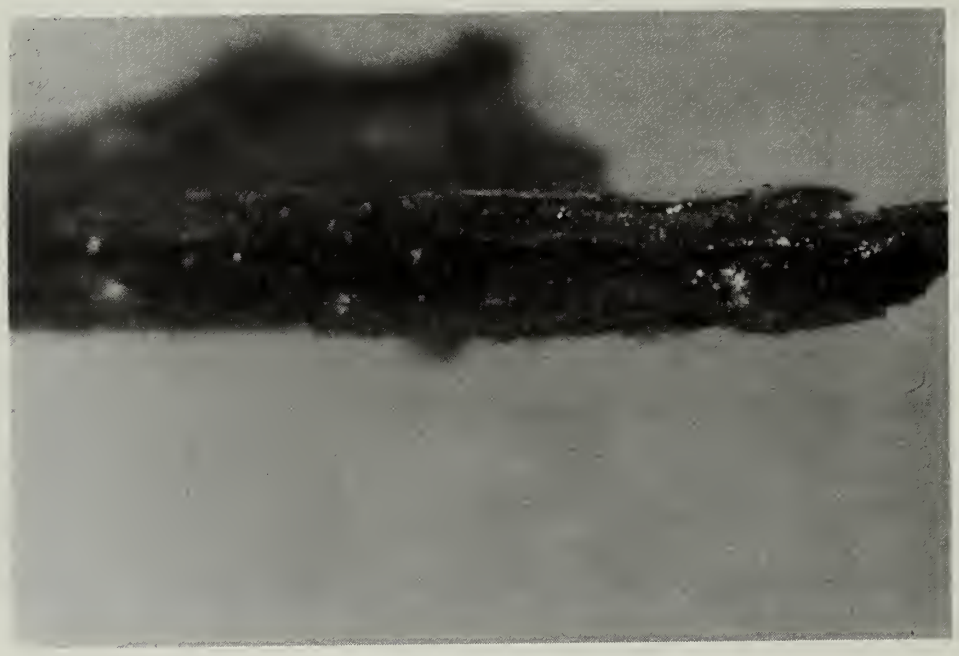
Figure 141. Tower interior: paint sample #FIIS 13 P033, wall of sixth-landing room (1983).



Figure 142. Tower interior: stairway in Watch Room (1983).



Figure 143. Tower interior: underside of stairway in Watch Room (1983).



SAMPLE NO.: FIIS 13 P045
LOCATION: Stair to Lantern from Watch Room

APPROXIMATE NUMBER OF LAYERS: 21
SUBSTRATE: Metal

CHROMOCHRONOLOGY:

1. Brownish olive green
2. Brownish olive green
3. Brownish olive green
4. Brownish olive green
5. Dark gray
6. Dark gray
7. Dark gray
8. Dark gray
9. Dark gray
10. Dark gray
11. Dark gray
12. Black
13. Orange red
14. Orange red
15. Orange red
16. Dark green
17. Dark green
18. Olive green
19. Aluminum silver
20. Medium brown
21. Gray

Figure 144. Tower interior: paint sample #FIIS 13 P045, Watch Room stairway (1983).

CENTRAL COLUMN AND CONDUITS

In the center of the lighthouse is a column that extends from ground level all the way up to the floor of the Watch Room. Its design differs in various areas, as discussed subsequently.

Column in Tower

Description

Location Center of tower, serving as newel of main spiral stairway.

Material Cast iron.

Dimensions 3 feet 3 inches circumference; 10¾ inches in diameter at narrowest point; 3 feet 8 inches at upper lip; 7 inches high from joint to joint.

Design The central column in this part of the lighthouse was cast in sections, featuring hub-and-sleeve parts that interlock. The hub parts have a lip around their upper edges. Each of the wrought-iron girders supporting the spiral steps consists of one piece, formed to encircle the column above each hub lip, and to rest on the lip.

Finish Painted gray.

Condition The column appears to be structurally sound. It is badly corroded at ground level and scaling severely. The column is separating at the 14th section to landing #1, and at the 13th section to landing #6. There are holes in several sections, as well: in the 11th, 15th, and 16th sections to landing #1, and in the 21st, 22nd, and 24th sections to landing #6.

The finish is deteriorated, flaking and peeling throughout and exposing the bare metal, particularly below landing #4.

Documentation

Figures 128, 131-132, 136, 145-146.

Paint samples FIIS 13 P003: central column, main stairwell.
FIIS 13 P012: central column, main stairwell (fig. 147).
FIIS 13 P016: central column, top portion before rooms (fig. 148).

Historical Background

The central column in this area, historically called the newell, is original, and has survived completely intact. In 1865, it was recorded that a break in the "clockworks cord," which ran inside the hollow column, caused serious damage to the newell. The damage was repaired that same year, and the stairway was repainted. This was only seven years after construction.

The 1861 specifications for a "Brick Tower" (App. D-1) describe the ironwork to be finished as follows: "All the ironwork of structure must be painted with two coats of white lead in oil, at the workshop; and when fixed in the tower, to receive two additional coats of green paint and one coat of varnish." The earliest paint layers on samples extracted from the column are an olive-green color, possibly reflecting the system of coatings just described. Further microscopic investigation is required before any definite conclusions are drawn.

Column in Sixth-Landing Room

Description

Material Cast iron.

Dimensions Not taken.

Design The central column in this area extends the full height of the room; the interior partition wall partially intersects it. The column surface in this room is smooth, having only one ring-like protrusion that is located the top of the column but below the level of the joists of the Service Room's floor. A large cast hole is located in the column's center, at floor level. Several conduits are associated with the column, and will be described later.

Finishes Painted gray.

Condition Condition is good, despite paint chipping and some minor corrosion, particularly at floor level.

Documentation

Figures 149-150.

Paint samples FIIS 13 P015: central column, sixth-landing room.

Column in Service Room

Description

Material Cast iron.

Dimensions Not taken.

Design The central column, which extends up all the way from the base of the tower, ends at the ceiling of this room. Like the portion of column in the sixth-landing room, it has a smooth surface with a single ring-like protrusion at its upper end. The smooth surface, however, is the result of vertical and horizontal seams having been filed and sanded down. The northeast side of the column exhibits two holes that look as if they were drilled to admit the conduits associated with this portion of the column. These conduits will be described later.

Finish Painted gray.

Condition Good.

Documentation

Paint sample FIIS 13 P038: central column, Service Room.

Historical Background

Figure 65, dating to 1894, illustrates the portion of column in the Service Room. The diameter of the column is shown as +/- 12 $^{7}/_{16}$ inches, with a thickness of three-quarters of an inch. It is recorded as being of iron. The column and clock weights' dimensions are included in figure 66, also dating to 1894. Figure 64 is a sketch "showing alteration of the Watch Room floor and column to ___?___ apparatus." This work was never performed. The extant column dates to the 19th century, and is presumably original.

Conduits

Description

Location A number of conduits serve the lighthouse. These enter the structure at ground level, traveling along the arched ceiling of the entry hallway. The conduits then run to the central column, and ascend either along it or inside of it.

Material Various.

Design There are basically four conduits associated with the central column today. For identification purposes they will be referred to as follows:

Conduit A: This conduit is a copper pipe that runs along the east side of the column, ending in the Service Room. It is attached to the outside of the column by metal straps that are bolted on either side to the column. The conduit looks later than the column itself, but paint evidence indicates that it is still quite early. It still contains its wires, although it is cut off at the ground floor of the tower. This cut occurs just above the push button of a call bell; the button remains attached to the column at ground level, on the eighth section up from the floor. Thus, conduit A may have served a call bell.

Conduit B: This conduit is a small metal pipe that runs alongside conduit A. It dates to the 1930's, when electricity was introduced to the tower. It also ends in the Service Room, five-sixths of the way up the column, at a light fixture and switch box.

Conduit C: This conduit is a metal pipe attached to the west-northwest side of the column, ending in the Watch Room. It is about the size of conduit A, but is from the same period as conduit B, serving a light fixture and switch box in the Watch Room.

Conduit D: This conduit is a black, ridged cable that serves the extant radio antenna. From the entry hallway, the cable ascends between conduits A and B in the main stairwell; runs inside the pedestal in the Watch Room; and exits through the Watch Room doorway to the lower balcony, where the antenna is located.

Miscellaneous Conduits: Two black cables are attached to the underside of the upper balcony, but they are cut off where they once entered the Watch Room, at the plywood panel above the doorway. Two gray cables pass through the north vent box in the wall of the Watch Room, running up through the ceiling to the lantern. A third, black cable passes through the vent box and runs to the pedestal. Still another black cable runs through the lantern's floor into the Watch Room, and goes to the pedestal.

Finish Conduits A, B, and C are painted gray, except along the walls and ceiling of the entrance hallway, where some of the conduits are whitewashed.

Conditions Conduits deactivated: paint film deteriorated.

Documentation

Figures 151-155.

Paint samples FIIS 13 P013: tower, conduit B.
FIIS 13 P014: tower, conduit A (fig. 156).

Historical Background

The extant conduits require further investigation as to their purpose. Recorded here are all references to the call bell and speaking tubes that were located in the historical research.

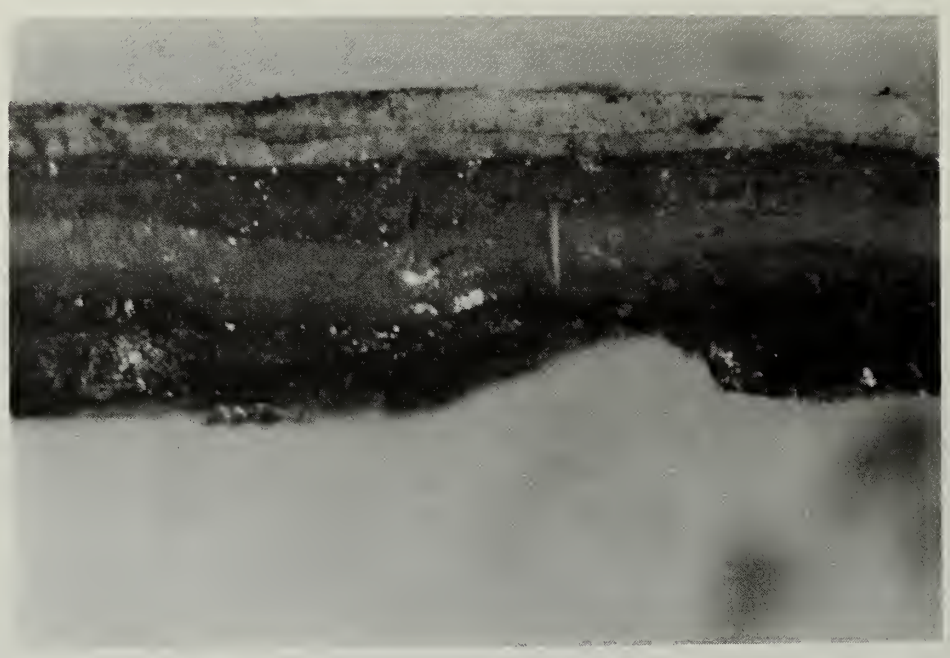
1871 - speaking tubes and alarm bell attached to the tower.
1877 - bell springs repaired.
1896 - new bell pull for tower furnished.
1902 - hammers of keeper's call bell in tower - supplied one new; repaired old.
1904 - two brass speaking tubes from tower to Watch Room furnished.
1918 - lightning struck tower and followed down the call-bell wire to hall of the dwelling.



Figure 145. Tower interior: central column corrosion (1983).



Figure 146. Tower interior: central column, seam separation (1983).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P012
LOCATION: Central Stairs Column

APPROXIMATE NUMBER OF LAYERS: 21+
SUBSTRATE: Metal

CHROMOCHRONOLOGY:

1. Orange red
2. Olive green
3. Olive green
4. Black
5. Black
6. Black
7. Black
8. Black
9. Black
10. Black
11. Black
12. Rust red
13. Orange
14. Orange
15. Rust brown
16. Orange red
17. Rust brown
18. Medium brown
19. Olive green
20. Gray
21. Gray

Figure 147. Tower interior: paint sample #FIIS 13 P012, central column (1983).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P016
LOCATION: Central Column, Top Section, Before Rooms

APPROXIMATE NUMBER OF LAYERS: 22+
SUBSTRATE: Metal

CHROMOCHRONOLOGY:

1. Rust (corrosion)
2. Olive green
3. Olive green
4. Black
5. Black
6. Black
7. Black
8. Black
9. Black
10. Black
11. Black
12. Rust red
13. Orange red
14. Orange red
15. Orange red
16. Rust brown
17. Rust red
18. Rust brown
19. Medium brown
20. Olive green
21. Gray
22. Gray

Figure 148. Tower interior: paint sample #FIIS 13 P016, central column near sixth-landing room (1983).



Figure 149. Tower interior: top of central column in sixth-landing room (1983).



Figure 150. Tower interior: bottom of central column in sixth-landing room (1983).



Figure 151. Tower interior: conduits entering through entrance-doorway fanlight (1983).

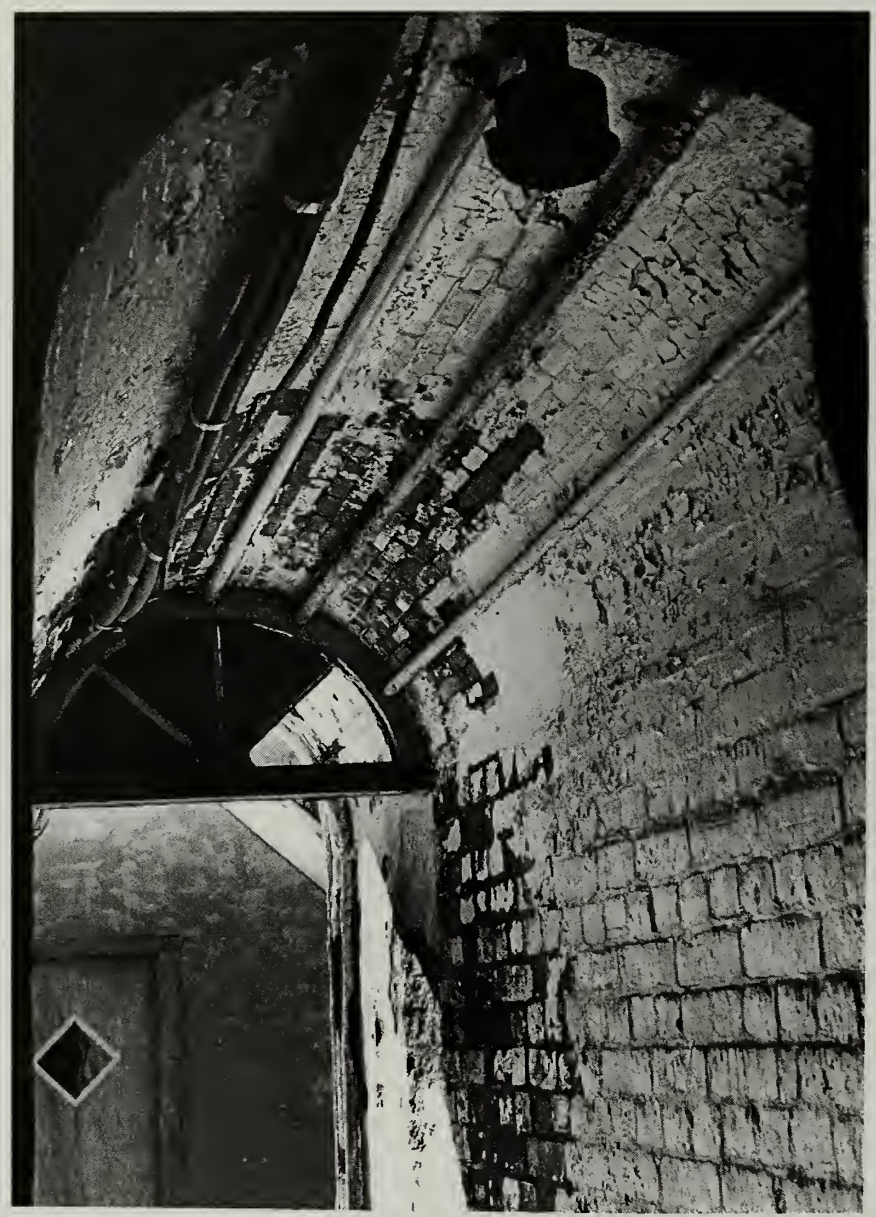


Figure 152. Tower interior: conduits at ceiling of entrance hallway (1983).



Figure 153. Tower interior: conduits along central column (1983).

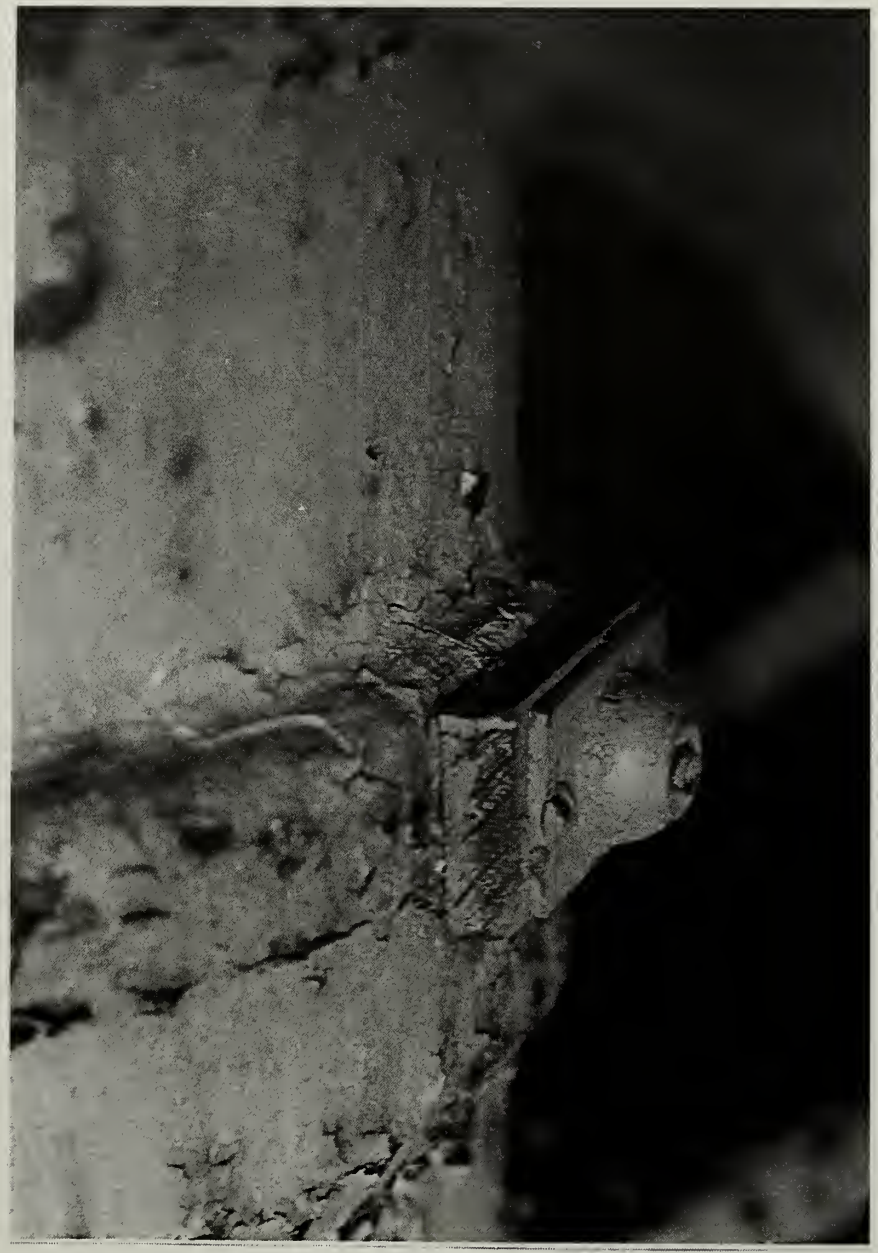


Figure 154. Tower interior: call-bell button, on central column at ground level (1983).



Figure 155. Tower interior: conduits in Watch Room (1983).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P014
LOCATION: Interior - Wider Conduit Following Column (Earlier Copper Pipe)
APPROXIMATE NUMBER OF LAYERS: 14+
SUBSTRATE: Metal

CHROMOCHRONOLOGY:

1. Black
2. Black
3. Black
4. Black
5. Black
6. Rust red
7. Orange red
8. Orange red
9. Rust brown
10. Rust red
11. Rust brown
12. Medium brown
13. Olive green
14. Gray

Figure 156. Tower interior: paint sample #FIIS 13 P014, conduit A (1983).

DOORWAYS AND DOORS

Entrance Doorway

Description

Location South wall of lighthouse, at base.

Material Wood.

Dimensions 31¾ inches wide by 77½ inches high.
Door panels (lower) 9 inches wide by 25 1/8 inches long.
(upper) 9 5/8 inches wide by 29½ inches long.

Design The doorway into the tower is arched, featuring a semicircular fanlight having four wedge-shaped lights. Its door opens outward; it is mortised and tenoned, with four recessed panels. An applied ogee molding covers the joints where the panels meet the rails and stiles. The outside face of the door features a keyhole escutcheon, the remains of a doorknob, two hasps, and two warning signs installed by the U.S. Coast Guard. The interior face of the door exhibits two strap hinges mounted on pintles, and a metal rim lock with a mineral doorknob. The brick jamb of the archway on the east side is recessed to accommodate the door. The same jamb is notched out to receive the doorknob, as well. No raised threshold is extant.

Hardware The pintles appear to be early and are set into two granite blocks. Apparently the blocks were installed specifically to secure the pintles. Dimensions of the granite: top block 6 inches wide by 9 inches high; bottom block 5¾ inches wide by 9 inches high. The pintles are iron.

The hinges are attached to the inside of the door, on the east stile. They are strap hinges, and are of two designs. The door has been cut out to allow the hinges to rest flush with the door face. The strap hinges are approximately one foot long. The top hinge appears to be later than the lower hinge.

The metal rim lock is 5 inches wide by 7 ¾ inches long, and appears to be original to the door. The lock exhibits a mineral doorknob on its inside face, while the doorknob is missing on the outside. The outside face of the door features the keyhole escutcheon for the lock.

Finish Painted white, with the exception of the exterior surface of the panels (excluding the molding), which is green.

Condition Paint is peeling on the door and its hardware. The door and fanlight have been adversely affected by attempts to secure the door with modern hardware. The fanlight is badly deteriorated, and its west light is missing. The hardware is in poor repair; the metal rim lock is corroded.

Documentation

Figures 151-152, 157-162.

Paint samples FIIS 13 P060: Entry door, interior (fig. 163).
FIIS 13 P062: Entry doorway, fanlight, exterior.
FIIS 13 P063: Entry doorway, interior east jamb.
FIIS 13 P064: Entry doorway, exterior jamb.
FIIS 13 P065: Entry doorway, jamb base.
FIIS 13 P066: Entry door, exterior.

Historical Background

Figure 56, theorized to be a revised original construction drawing (ca. 1858), shows an arched doorway with three-light fanlight. The location of the hardware is noted as well. Only one other historical reference to the entrance doorway was found: the Form 36, prepared in 1880, notes that the Fire Island lighthouse had one door, presumably the entrance doorway. The door extant today dates to the 19th century, and may be original. The current fanlight appears to be a later replacement, based on paint analysis. The mortise lock is from the 19th century, and is probably contemporaneous with the door. The strap hinges, however, appear to have been altered. Careful paint removal in the lock and hinge locations would reveal evidence of any earlier hardware.

Doorway at Sixth-Landing Room

Description

Location Interior partition wall at west end of sixth landing.

Material Wood.

Dimensions Doorway opening 34 inches wide by 81½ inches high.
Door size 33¾ inches wide by 81 inches high by 1 3/8 inches thick.
Door panels (upper) east ones 9¾ inches wide by 44 3/8 inches long
west ones 9 7/8 inches wide by 44 3/8 inches long
(lower) 9 ¾ inches wide by 17 inches long.

Design The top of the doorway opening consists of a two-course relieving rowlock arch 17 bricks wide. A simple wooden frame with beaded edges is set into the opening, to hold the four-paneled, mortise-and-tenon door. The door's recessed panels are rimmed with an applied molding.

Trim Header 4 inches wide; sides 4 3/8 inches wide; 1 inch thick. Jamb boards are 8½ inches wide. The wooden sill overlaps the top step of the main stairway.

Hardware Two butt hinges 3 inches long on the west stile of the door.
Metal rim lock with dark-brown mineral doorknob on the room side of the door.

Finish Trim, door, and hardware painted white.

Condition Paint is alligatored and deteriorated on the door and trim. Paint is completely gone from the rim lock and hinges. Door does not close.

Documentation

Figures 97, 164-166.

Paint samples FIIS 13 P029: Sixth-landing room door, stairway side.
FIIS 13 P030: Sixth-landing room door, room side (fig. 167).
FIIS 13 P031: Sixth-landing room door, north trim, stairway side.
FIIS 13 P035: Sixth-landing room door, south trim, room side.

Historical Background

No historical references to the door between the tower stairwell and the sixth-landing room have been located. Presumably the door is original, despite the scant number of painted finishes it has received: there is no visible evidence for another door. Stylistically, the door dates to the 19th century.

Doorway from Watch Room to Lower Balcony

Description

Location South wall of the Watch Room.

Material Iron doorway frame, wooden door.

Dimensions Doorway opening 24½ inches wide by 69 inches high.
Door size 24¼ inches wide by 56 ½ inches high by 1½ inches thick.
Door window 14 3/8 inches wide by 14½ inches high.
Doorway jamb depth 14 ¼ inches.

Design The doorway opening consists of a brick arch that contains an iron doorway frame. Apparently, the existing doorway opening and frame were designed to accommodate two doors–an interior door, and an exterior storm door. The frame is designed to have both doors hung to the west jamb, with the interior door swinging in and the exterior door swinging out. The storm door is currently missing, but the hardware evidence that remains implies that there were at least two former storm doors. The earlier storm door was secured directly to the iron doorway frame, while the more recent door was attached to later wooden trim. The extant interior door is a modern wooden replacement with a small window. It has a modern aluminum threshold.

Above the door is a pair of wooden panels, each panel being sawn to follow the contours of the arch. These panels predate 1962 (fig. 60), and have been randomly cut to allow for three conduits entering from the outside.

The modern interior door is hung with modern butt hinges, although the iron pintles for the original door are still extant. The storm doors always featured butt hinges.

Threshold Modern aluminum, screwed to the floor. The floor within the brick jamb area consists of six octagonal, ceramic, buff-colored tiles $6^{1}/_{8}$ inches wide. They are set in concrete. This flooring was installed presumably with the current Watch Room floor.

Hardware Door check is Yale hydraulic Model 59 No. 74.

Modern butt hinges on the interior door; the most recent storm door trim exhibits modern butt hinges, but a ghost for an earlier butt hinge is evident on the iron door frame.

Interior west jamb features pintles–one set at the top and one set at the bottom. The iron pintles are 1½ inches long by half an inch thick.

Doorknobs are modern brass ones.

No lock is extant, although there is a recessed area in the east member of the iron doorway frame to receive a lock.

Finish Entire doorway, except hardware, painted black.

Condition Iron doorway frame exhibits corrosion and loss of paint. Pintles are deteriorated. Storm door is missing and later wooden trim is deteriorated. Arched panels above door are extremely weathered, featuring loss of paint. Threshold's ceramic tile is cracked.

Documentation

Figures 168-170.

Paint samples FIIS 13 P007: Watch Room doorway, outside jamb.
FIIS 13 P046: Watch Room doorway, panel above door.
FIIS 13 P048: Watch Room doorway, interior trim.

Historical Background

The historical documentation concerning the Watch Room's door to the lower balcony is confusing. Not only does the documentation frequently refer to the door as the "Lantern door," but it also makes little or no distinction between the interior door and the storm door here. The current door of the Watch Room dates to 1962, according to figure 60. It replaced either a door of unknown material installed in 1911 (App. C-120) or an iron door installed in 1903 (App. C-105). The door

extant prior to that was probably the wooden, copper-lined door mentioned in the Form 36 from 1880 (App. C-86).

The storm door currently missing from the doorway was installed in 1962, along with the present interior door (fig. 60). The door preceding this one appeared to have three round-headed upper lights (fig. 20). This was probably the door that received "two new rollers" (hinges?) in 1903 (App. C-105). A storm door was in place and being repaired as early as 1888 (App. C-85). This is likely the windowless, solid-color door seen in figure 11 (ca. 1886). This door may also have been a wooden, copper-lined door (App. C-86).



Figure 157. Tower exterior: entrance doorway (1982).



Figure 158. Tower exterior: entrance-doorway fanlight (1982).



Figure 159. Tower interior: entrance door, lock (1983).



Figure 160. Tower exterior: entrance door, key escutcheon and remnant of doorknob (1983).

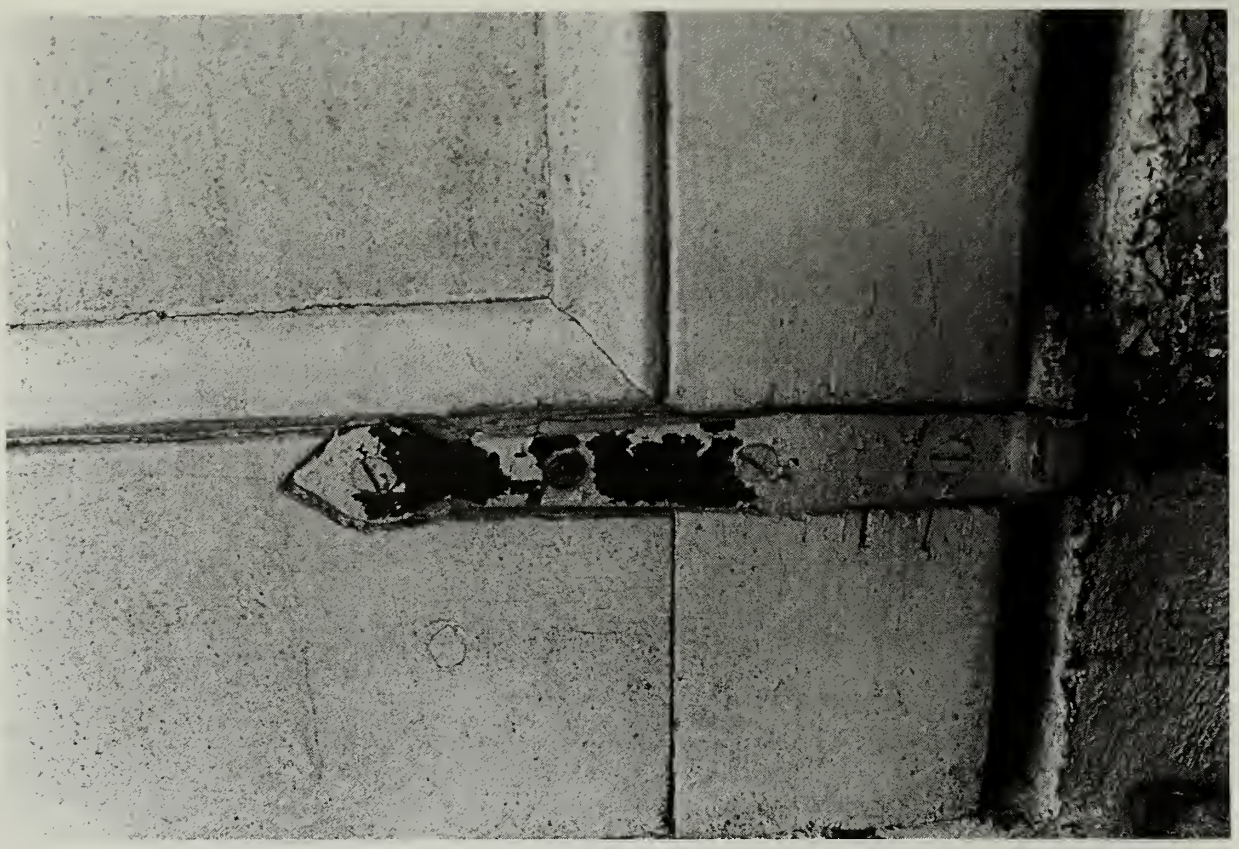


Figure 161. Tower interior: entrance door, strap hinge and pintle (1983).

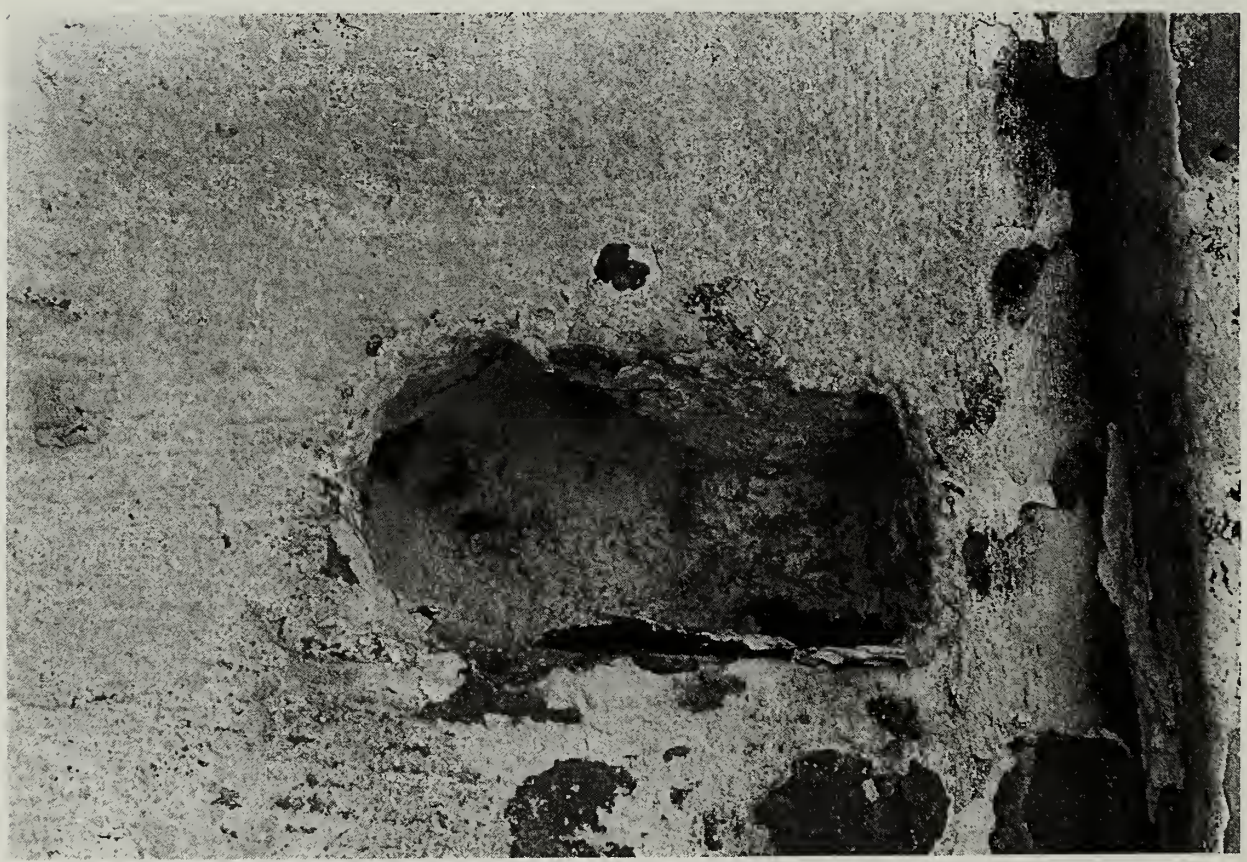
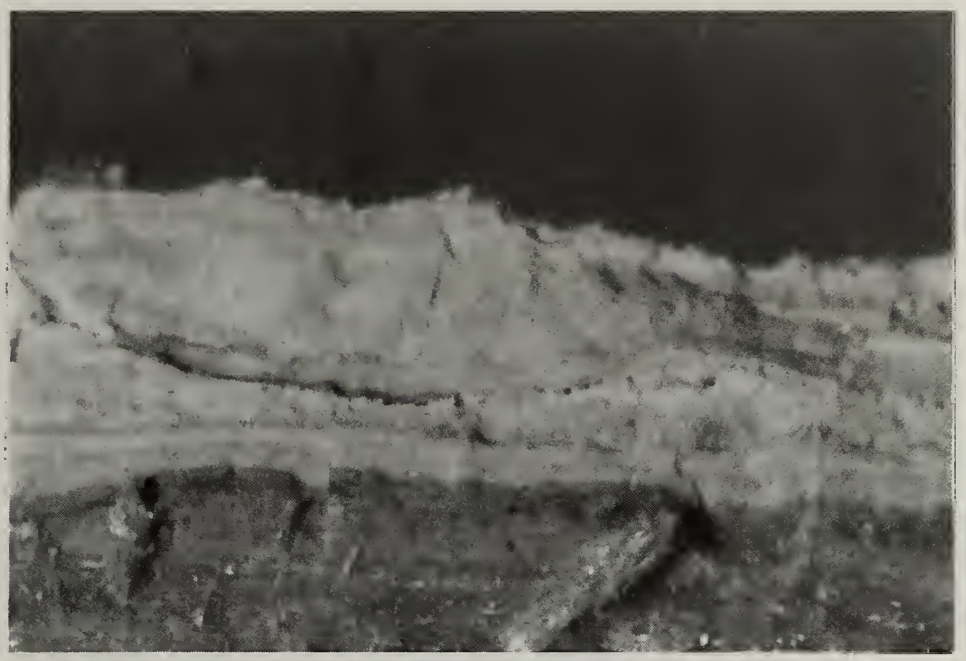


Figure 162. Tower interior: entrance doorway, east jamb area recessed for doorknob (1983).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P060
LOCATION: Tower, Entry Door, Interior Side

APPROXIMATE NUMBER OF LAYERS: 18+
SUBSTRATE: Wood

CHROMOCHRONOLOGY:

1. Cream
2. Varnish
3. Cream
4. Light gray
5. White
6. White
7. White
8. White
9. White
10. White
11. White
12. White
13. White
14. White
15. White
16. White
17. White
18. White

Figure 163. Tower interior: paint sample #FIIS 13 P060, entrance door (1983).

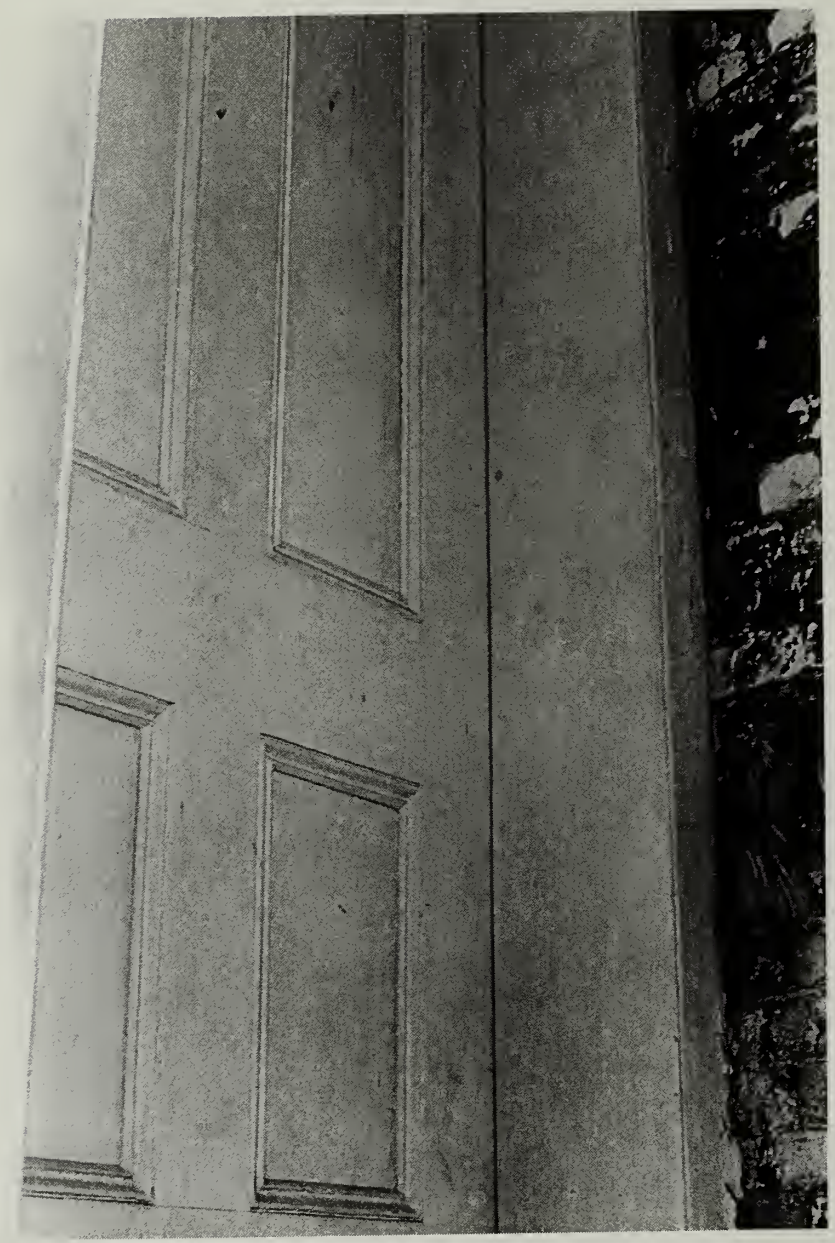


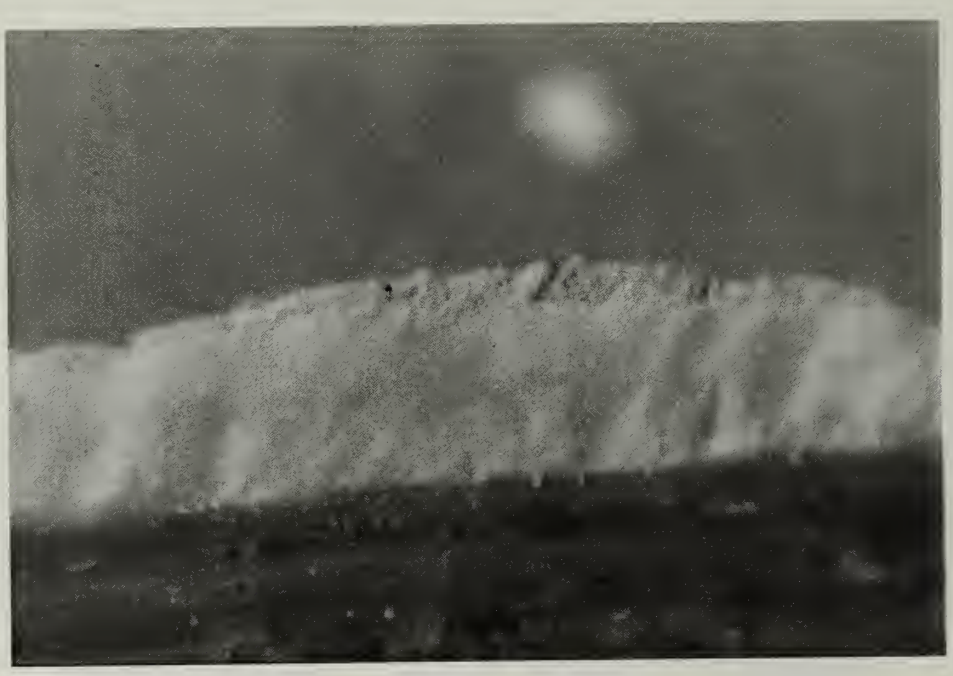
Figure 164. Tower interior: doorway from main stairway to sixth-landing room (1983).



Figure 165. Tower interior: sixth-landing room, rim lock of door to main stairway ((1983).



Figure 166. Tower interior: sixth-landing room, butt hinge of door to main stairway (1983).



SAMPLE NO.: FIIS 13 P030
LOCATION: Door, Interior Side, Facing 6th Landing Room

APPROXIMATE NUMBER OF LAYERS: 4+
SUBSTRATE: Wood

CHROMOCHRONOLOGY:

1. White
2. White
3. White
4. White

Figure 167. Tower interior: paint sample #FIIS 13 P030, room side of sixth-landing room door (1983).



Figure 168. Tower interior: Watch Room doorway to lower balcony (1983).



Figure 169. Tower interior: Watch Room doorway to lower balcony, with early pintles and later hinges (1983).



Figure 170. Tower exterior: lower balcony doorway to Watch Room, with iron frame and evidence of early hardware (1983).

WINDOWS

General Information

Description

Location Seven double casement windows, one at each of the six landings, and one on the west-southwest wall, before the sixth landing. These windows have been numbered for ease of reference as follows:

landing #1	window #1
landing #2	window #2
landing #3	window #3
landing #4	window #4
landing #5	window #5
wall before landing #6	window #6
landing #6	window #7

Three roundels are located on the north wall of the Service Room.

Material Wooden sashes and trim for the casement windows; the three roundels featured bronze sashes (no longer extant).

Dimensions Varies from window to window.

Design The six windows associated with the stairway landings are set into tall, arched openings in the brick tower wall. The floors of these openings, which are about level with the landings to which they correspond, are paved with stone slabs. The jambs of the openings consist of courses of alternating stretchers and headers (English common bond). The heads of these openings are composed of specially molded, tapered bricks. The construction of window #6 is similar to this, but since it is not level with any landing, its sill is not paved with stone.

The arched openings contain wooden frames designed to hold both a set of interior sashes and a set of exterior storm sashes, several inches apart. The window frames do not extend all the way to the floor of the window openings: there is infill below each window. Usually this consists of several courses of brickwork topped by a wooden sill, but the infill varies by window, as will be described shortly. The underside of the frame's arched head is composed of small sections of wood assembled and molded to form the curve. (The joints between these boards are visible where the paint has deteriorated.) The cheek pieces of the frame consist of narrow stock, from 2 inches to 2¼ inches wide, that follows the curve of the arched opening. The edges abutting the sashes are molded with a half-bead. A straight board serves as a window stop for windows #1-5, but windows #6 and 7 have molded stops.

All seven windows have two fixed sashes above two operative casement sashes. The fixed sashes have curved heads to match the curvature of the arched openings; the operative sashes are rectangular. Windows #1-5 have four lights in each of their fixed sashes, for a total of eight per window. Their operative sashes are two lights wide by five lights long, for a total of 10 lights per sash, 20 lights per window. Windows #6 and 7 are smaller than the other five windows. Their fixed sashes have only one light each. Their operative sashes are only one light wide by five lights long, for a total of five lights per sash, 10 lights per window.

The sizes of the lights in the operative sashes are as follows:
windows #1-5: 8 inches wide by 12 inches high
windows #6-7: 10 inches wide by 12 inches high

As mentioned, the windows' frames are designed to accommodate not only the previously described interior sashes, but also identical exterior storm sashes. The operative interior sashes swing into the tower, while the operative exterior sashes swing out. Each sash is hung with two butt hinges.

It has been stated that the inner edges of the windows' frames are molded with a half-bead. This provides a finished appearance for the outer sides of the double sashes. A similar bead is found on the bottom edge of the fixed sashes; on the upper edges of both operative sashes; and along the center edge of each right-hand operative sash. The center edge of each left-hand sash is not beaded, because this sash shuts first, with the right-hand sash closing over it and covering its center edge. Thus, only the right-hand sash bears a sash pull and latches to hold it closed. The same situation is true for the exterior storm sashes. The left-hand sash closes first; the right-hand sash closes over it, with the aid of a sash pull, and is secured by two bolts.

The three roundels are 1 foot in diameter. They are formed by three courses of brick laid up in a circle. The window sashes and frames were removed in the 1970's and replaced with plywood.

Hardware

All sashes hang on two brass butt hinges 3 inches long, with three screws per plate. Each window thus has eight hinges: four on interior sashes, four on storm sashes.

The sash pulls used on the interior sashes are located midway up the center stiles of the right-handed sashes. They consist of a simple handle, secured at its lower and upper end with a screw. The sash pulls for the exterior storm sashes are slightly different in design, but are attached similarly to the inside of the right-hand sashes.

The wooden toggle latches that hold the right-hand interior sashes closed are attached with a screw in the center. There are two latches per window, one at the top and one at the bottom. A simple hook and screw-eye holds each interior sash open. The hooks are embedded in the wall (most are missing), and the eyes are screwed into the sashes.

Two bolts hold each right-hand storm sash closed. The upper one is a barrel bolt with knob located on the inside surface of the sash; the lower one is a square spring-necked bolt attached also to the inside surface.

Finishes Trim, sashes, and hardware painted white.

Condition Most sashes are nailed shut, do not close properly, are full of debris, and exhibit deteriorated wood and paint loss. Numerous lights are broken or missing.

Documentation

Figures 59, 98-99, 102, 171-181.

Historical Background

The window openings have not been altered, although the sashes and glazing have been replaced to some degree. The windows have always exhibited double casement sashes, as the 1880 Form 36 (App. C-86) notes. Very little data has survived, however, describing changes to the windows. Figures 11 and 12, dating to ca. 1886, depict the windows with a finish that is darker than the tower. The 1861 specifications (App. D-1) for a "Brick Tower" states "all the woodwork of structure to have 3 coats of white zinc paint," but proceeds further with "the doors must be grained in imitation of oak, and have two coats of varnish." The paint stratigraphy in the windows' samples suggests that the Fire Island lighthouse windows were grained, and that the dark color visible in figures 11 and 12 is graining. The August 1888 monthly report notes that the brickwork around the windows of the tower was pointed.

The window sashes and trim are white in figure 20, dated August 12, 1900. Presumably, the sash color was changed in 1891 with the conversion of the tower's painted scheme to black and white stripes. The sashes and trim have remained white since that time.

Figure 60 is a drawing prepared September 19, 1962, depicting a method of applying plexiglass window coverings to the tower windows. This work was performed, and several windows retain fragments of the plexiglass shield.

Window #1

Description

Location Landing #1, facing north.

Arch Brick, with 37 courses of alternating stretchers and headers (English common bond) forming jamb; 53 courses of tapered brick forming arch. Depth of arch $54\frac{1}{8}$ inches; width of opening 44 inches.

Flooring Stone slabs. Space in center, for girder supporting landing.

Trim Wood, featuring narrow bead on edge that abuts sashes (typical design). Width of trim 2 inches. Height of wooden sill face $5\frac{7}{8}$ inches.

Sashes	Wood, two sets: interior and exterior storm (typical design).
Interior Hardware	Two butt hinges per sash (typical design). Sash pull on right-hand sash 4¾ inches high (not typical, featuring a convex handle). Wooden latches at top and bottom of right-hand sash (typical design). Two eye screws (typical design), above sash-pull level, on both sashes; hooks on jambs missing.
Exterior Hardware	Two butt hinges per sash (typical design). Sash pull on right-hand sash (typical design). Bolts at top and bottom of right-hand sash (typical designs).
Finishes	Sashes, trim, and hardware painted white.
Condition	Interior sashes have two cracked lights; exterior have two broken lights, and one is missing. Green mold exists on both inside brick jambs.

Window #2

Description

Location	Landing #2, facing west-southwest.
Arch	Brick, with 37 courses of alternating stretchers and headers (English common bond) forming jamb; 53 courses of tapered bricks forming arch. Depth of arch 34 inches; width of opening 43¼ inches.
Flooring	Stone slabs. Space in center, for girder supporting landing.
Trim	Wood, featuring narrow bead on edge that abuts sashes (typical design). Width of trim 2⅛ inches. Height of wooden sill face 5½ inches.
Sashes	Wood, two sets: interior and exterior storm (typical design).
Interior Hardware	Two butt hinges per sash (typical design). Sash pull on right-hand sash (not typical, featuring a convex handle). Wooden latches at top and bottom of right-hand sashes missing. Two eye screws (typical design), above sash-pull level, on both sashes; hooks on jambs missing.
Exterior Hardware	Two butt hinges per sash (typical design). Sash pull on right-hand sash (typical design). Bolt at top of right-hand sash (typical design); bolt at bottom of sash missing.
Finishes	Sashes, trim, and hardware painted white.

Condition Interior sashes have four cracked lights; exterior sashes have three missing lights, and one is cracked.

Documentation

Paint samples FIIS 13 P019: Window #2, outside jamb.
FIIS 13 P020: Window #2, outside sashes (fig. 182).
FIIS 13 P021: Window #2, inside jamb (fig. 183).

Window #3

Description

Location Landing #3, facing east-southeast.

Arch Brick, with 37 courses of alternating stretchers and headers (English common bond) forming jamb; 53 courses of tapered brick forming arch. Depth of arch 25¼ inches; width of opening 43 inches.

Flooring Stone slabs. Space in center, for girder supporting landing.

Trim Wood, featuring narrow bead on edge that abuts sashes (typical design). Width of trim 2⅛ inches. Height of wooden sill face 5½ inches

Sashes Wood, two sets: interior and exterior storm (typical design).

Interior Hardware
Two butt hinges per sash (typical design).
Sash pull on right-hand sash (typical design)
Wooden latch at bottom of right-hand sash (typical design); latch at top of sash missing.
Two eye screws (typical design), above sash-pull level, on both sashes; hook extant on left jamb, hook on right jamb missing.

Exterior Hardware
Two butt hinges per sash (typical design).
Sash pull on right-hand sash (typical design).
Bolts at top and bottom of right-hand sash (typical designs).
Two eye screws, attached to interior side of bottom rail; one hook extant on jamb.

Finishes Sashes, trim, and hardware painted white.

Condition Interior sashes have one cracked and one missing light; exterior sashes have one cracked and three missing lights. Efflorescence severe on both interior jambs.

Window #4

Description

Location Landing #4, facing north.

Arch Brick, with 37 courses of alternating stretchers and headers (English common bond) forming jamb; 53 courses of tapered brick forming arch. Depth of arch 43 1/8 inches; width of opening 20 7/8 inches.

Flooring Stone slabs. Space in center, for girder supporting landing.

Trim Wood, featuring narrow bead on edge that abuts sashes (typical design). Width of trim 2 inches to 2 1/8 inches. Height of wooden sill face 6 inches.

Sashes Wood, two sets: interior and exterior storm (typical design).

Interior Hardware
Two butt hinges per sash (typical design).
Sash pull on right-hand sash (typical design).
Wooden latch at top of right-hand sash (typical design); latch at bottom of sash missing.
Two eye screws (typical design), above sash-pull level, on both sashes; hooks on jambs missing.

Exterior Hardware
Two butt hinges per sash (typical design).
Sash pull on right-hand sash (typical design).
Bolts at top and bottom of right-hand sash (typical design).

Finishes Sashes, trim, and hardware painted white.

Condition Interior sashes have four cracked lights; exterior sashes have one cracked light. Right side of jamb exhibits severe efflorescence.

Window #5

Description

Location Landing #5, facing west-southwest.

Arch Brick, with 39 courses of alternating stretchers and headers (English common bond) forming jamb; 53 courses of tapered brick forming arch. Depth of arch 12½ inches; width of opening 43 1/8 inches.

Flooring Stone slabs. Space in center, for girder supporting landing.

Trim Wood, featuring narrow bead on edge that abuts sashes (typical design). Width of trim 2 1/8 inches to 2¼ inches. Height of stone sill face 5 inches.

Sashes Wood, two sets: interior and exterior storm (typical design).

Interior Hardware
Two butt hinges per sash (typical design).
Sash pull on right-hand sash (typical design).
Wooden latch at top of right-hand sash (typical design); no lower latch.
Two eye screws (typical design), one on bottom of right-hand sash and one below sash pull; hooks on jambs missing, but one screw eye remains in wall.

Exterior Hardware
Two butt hinges per sash (typical design).
Sash pull on right-hand sash (typical design).
Bolts at top and bottom of right-hand sash (typical design), but top bolt is missing upper portion of bolt.

Finishes Sashes, trim, and hardware painted white.

Condition Interior sashes have four cracked lights; exterior sashes have two cracked and one missing. Efflorescence on left jamb.

Documentation

Paint samples
FIIS 13 P022: Window #5, sashes.
FIIS 13 P023: Window #5, inside trim.

Window #6

Description

Location Window not at a landing, but between landings #5 and #6, facing west-southwest.

Arch Brick, with 29 courses of alternating stretchers and headers (English common bond) forming jamb; 39 courses of tapered bricks forming arch. Depth of arch 10 inches; width of opening 32 inches. Brick sill base.

Trim Wood, featuring narrow bead on edge that abuts sashes (typical design). Width of trim 2 1/8 inches. Height of wooden sill face 5 ¼ inches.

Sashes Wood, two sets: interior and exterior storm (typical design).

Interior Hardware
Two butt hinges per sash (typical design).
Sash pull on right sash (typical design).
Wood latch at bottom of right sash (typical design); latch at top of sash missing.
Two eye screws (typical design) at bottom rail; hooks missing.

Exterior Hardware
Two butt hinges per sash (typical design).
Sash pull on right-hand sash (typical design).
Bolts at top and bottom of right-hand sash (typical design).

Finishes Sashes, trim, and hardware painted white. Brick sill, one course around bottom and sides painted black.

Condition Interior sashes have one cracked light; exterior sashes have two cracked lights and one missing.

Documentation

Paint samples FIIS 13 P025: Window #6, inside sash (fig. 208).
FIIS 13 P026: Window #6, inside sill.
FIIS 13 P027: Window #6, trim (fig. 209).

Window #7

Description

Location Landing #6, facing southeast.

Arch Brick, with 29 courses forming jamb; 39 courses of tapered bricks forming arch. Depth of arch 9 ¼ inches; width of opening 32¼ inches. Brick sill base (one course).

Trim Wood, featuring narrow bead on edge that abuts sashes (typical design). Width of trim 2 ¼ inches. Height of stone sill face 6 ¾ inches.

Sashes Wood, two sets interior and exterior storm (typical design).

Interior Hardware Two butt hinges per sash (typical design).
Sash pull on right-hand sash, cast iron (not typical).
Wooden latches at top and center of right-hand sash.
One eye screw on bottom rail of left-hand sash; hooks missing.

Exterior Hardware Two butt hinges per sash (typical design).
Sash pull on right-hand sash (typical design).
Bolt at top of right-hand sash (typical design); never a bolt at bottom of sash.

Finishes Sashes, trim, and hardware painted white.

Condition Interior sashes: four cracked lights, one missing; exterior sashes: one cracked, one missing.

Documentation

Paint sample FIIS 13 P032: Window #7, trim.

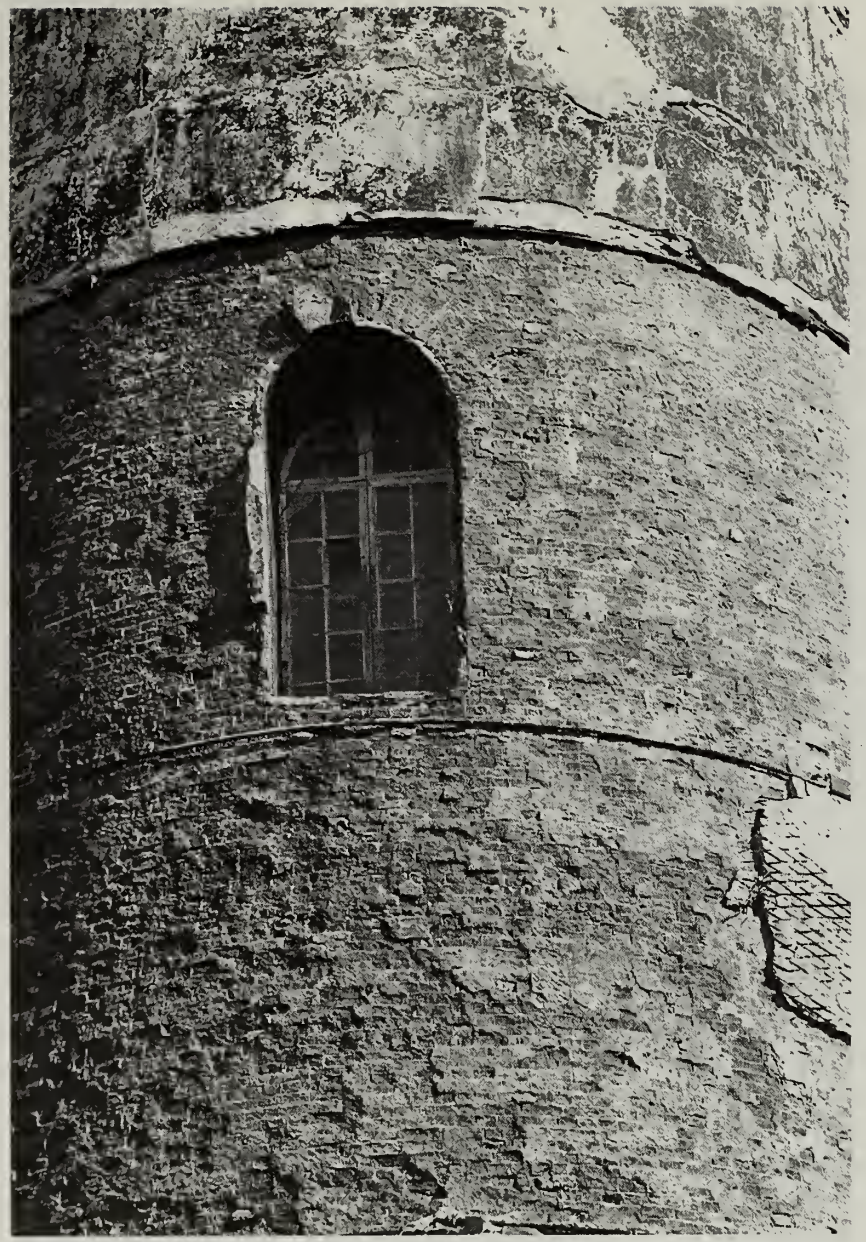


Figure 171. Tower exterior: arched window opening (1982).



Figure 172. Tower interior: round window opening (1983).



Figure 173. Tower interior: arched-window frame and sashes (1983).

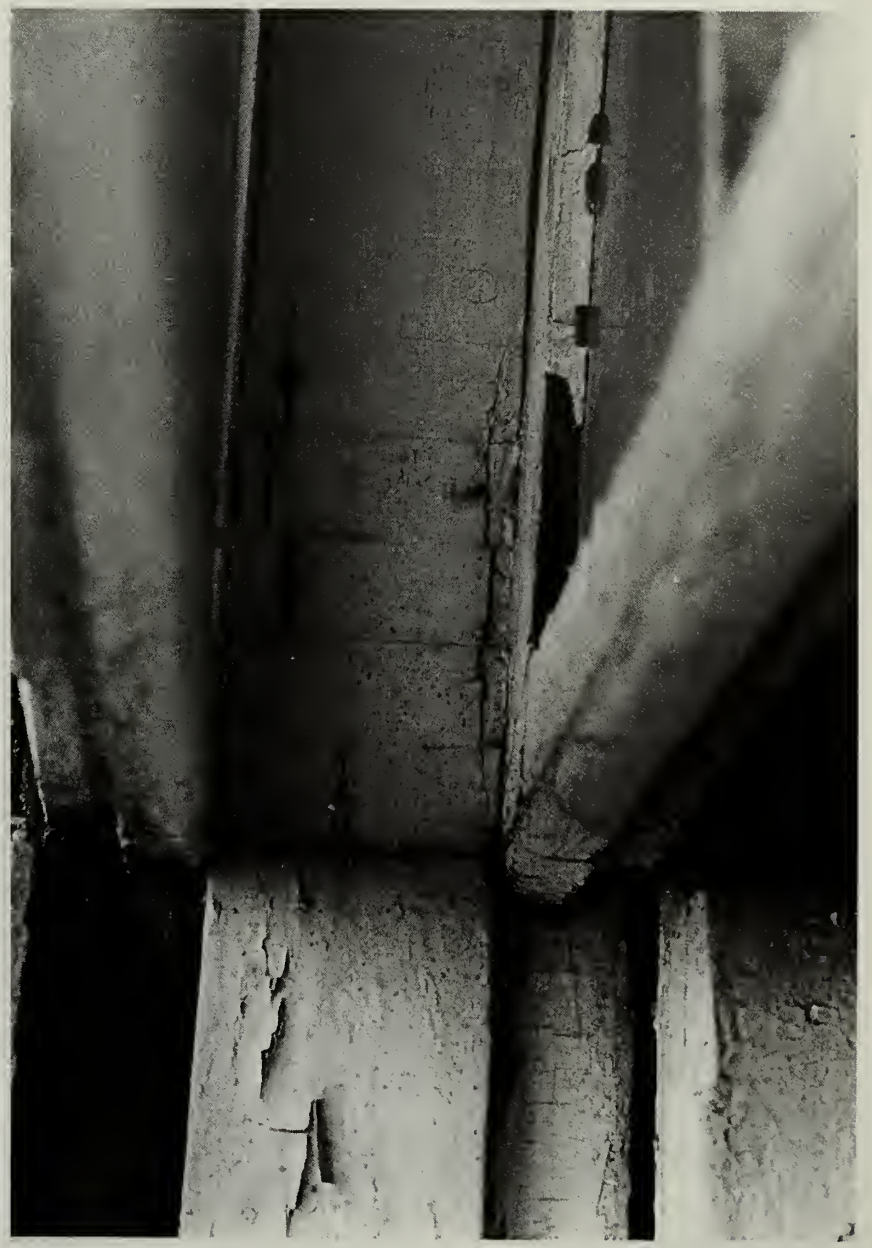


Figure 174. Tower interior: area of window frame between interior and exterior storm sashes(1983).



Figure 175. Tower interior: typical butt hinge for interior and exterior storm sashes (1983).

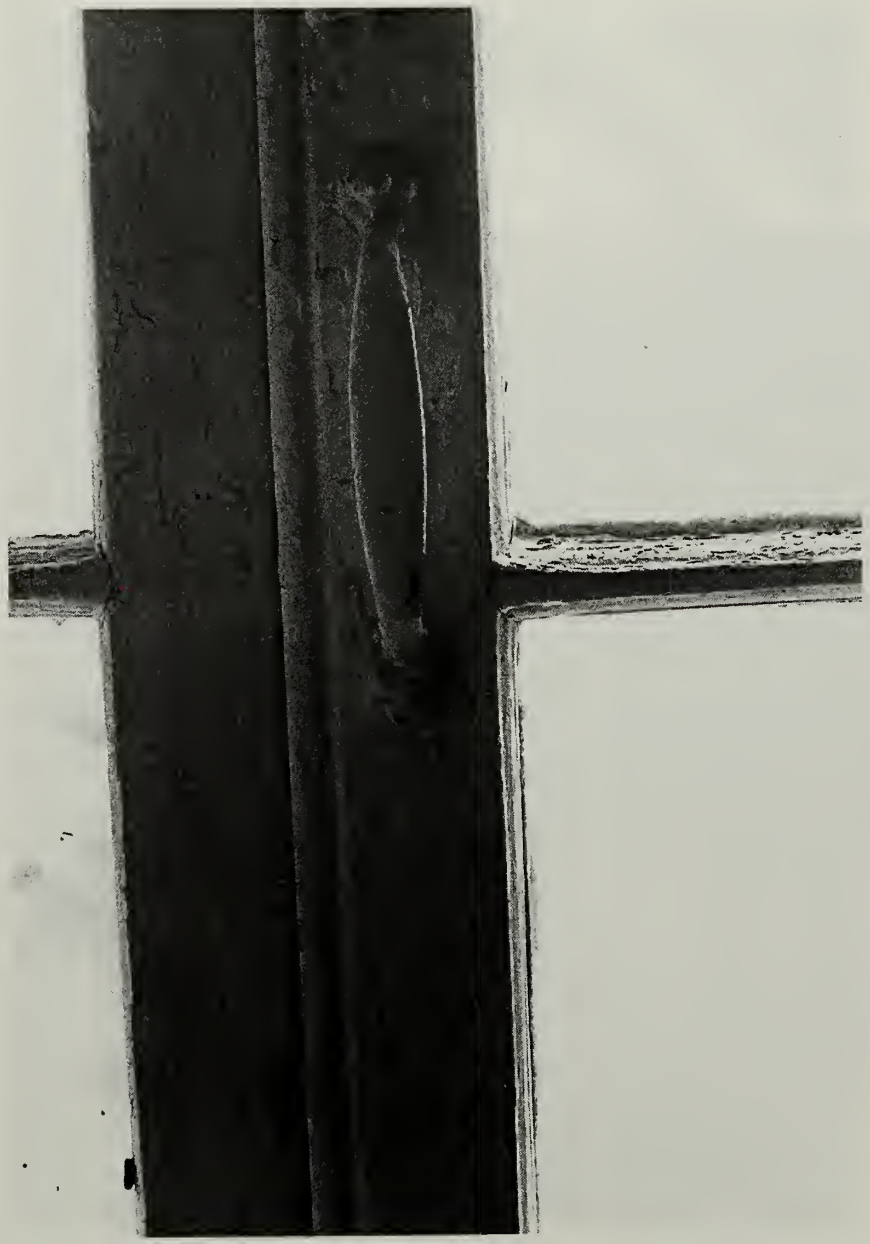


Figure 176. Tower interior: typical sash pull for interior sashes (1983).



Figure 177. Tower interior: typical sash pull for exterior storm sashes (1983).

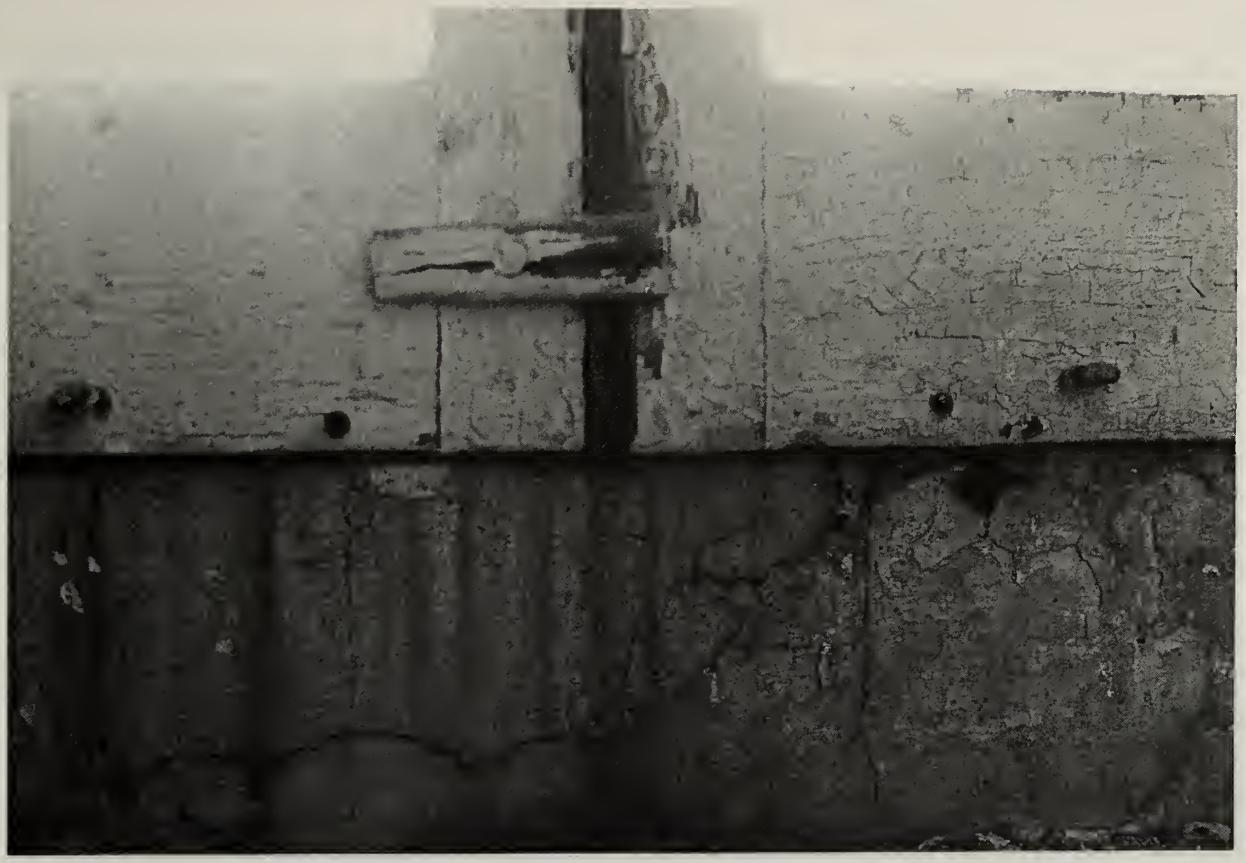


Figure 178. Tower interior: typical wooden latch for interior sashes (1983).



Figure 179. Tower interior: typical hook to hold sashes open (1983).



Figure 180. Tower interior: bolt latch at top of exterior storm sashes (1983).

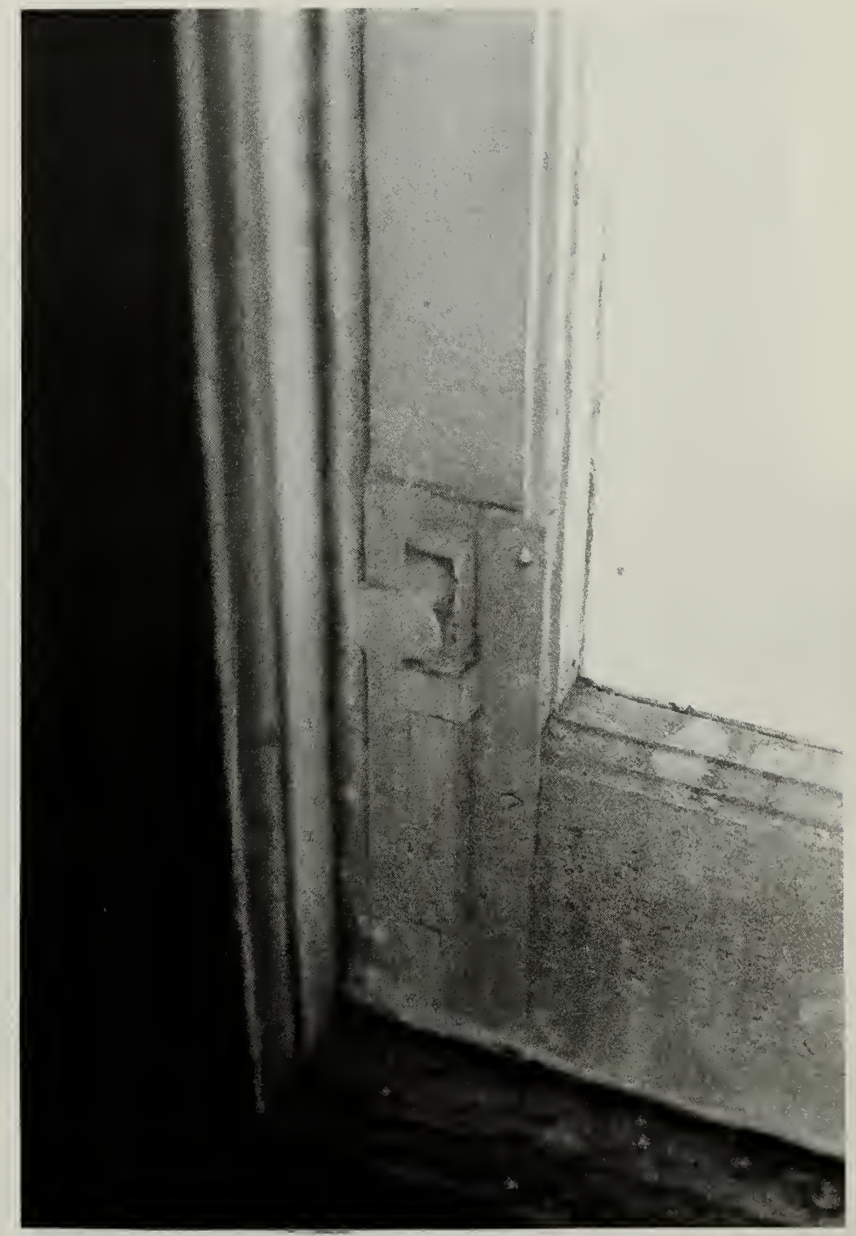
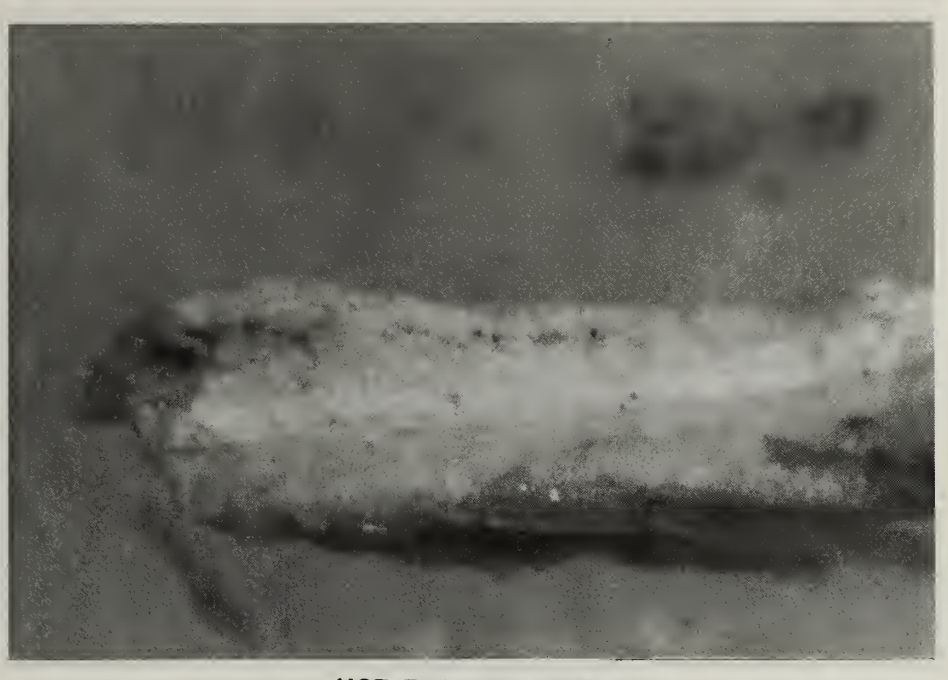


Figure 181. Tower interior: spring-necked bolt at bottom of exterior storm sashes (1983).



NOT FOR COLOR USE

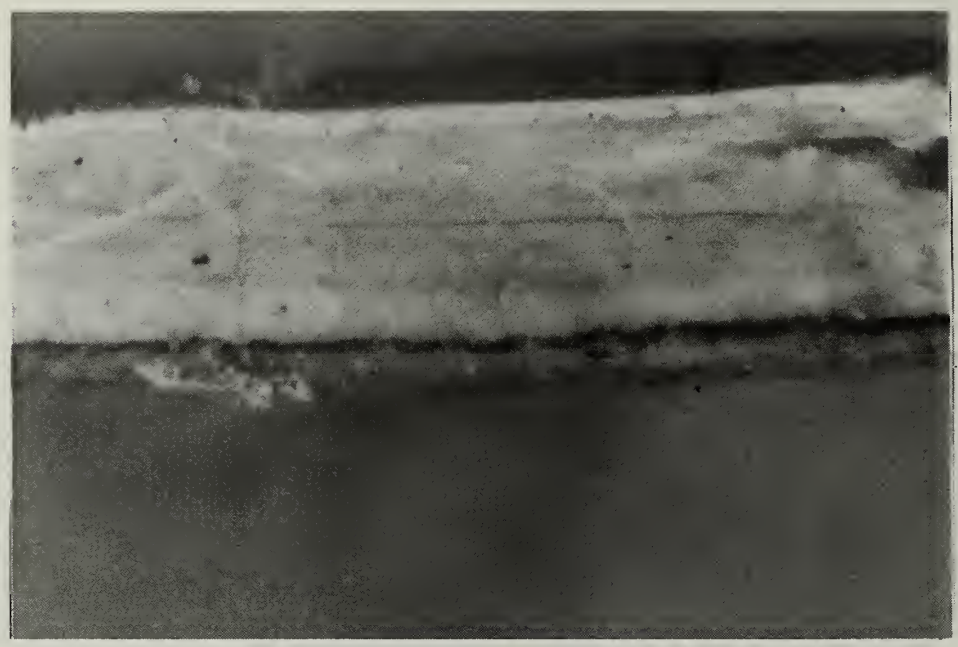
SAMPLE NO.: FIIS 13 P020
LOCATION: Window #2 - Outside Sash

APPROXIMATE NUMBER OF LAYERS: 7+
SUBSTRATE: Wood

CHROMOCHRONOLOGY:

1. White
2. White
3. White
4. White
5. White
6. White
7. White

Figure 182. Tower exterior: paint sample #FIIS 13 P020, outer side of storm sashes (1983).



NOT FOR COLOR USE

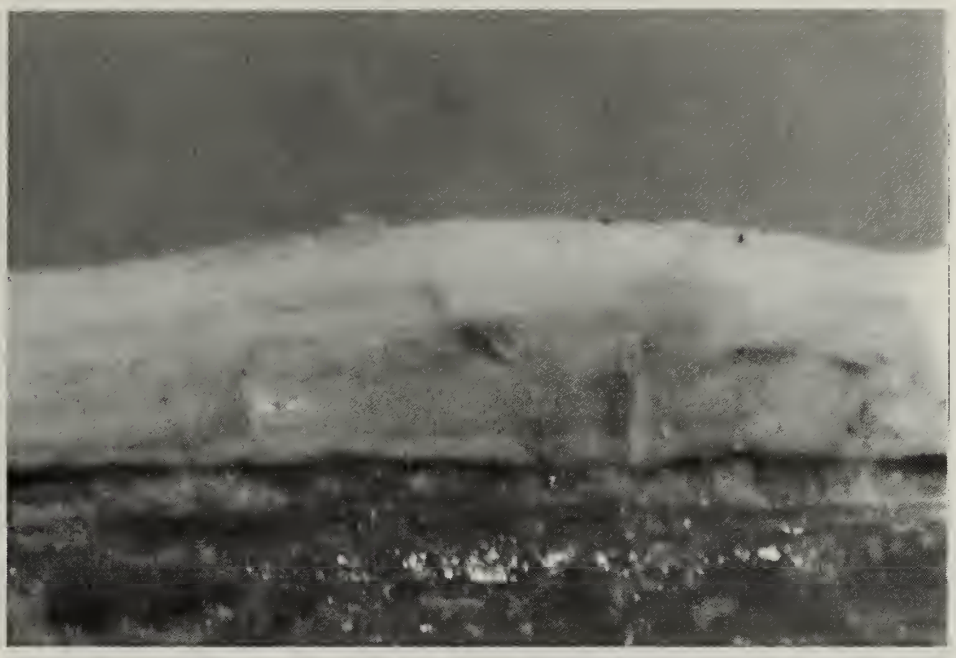
SAMPLE NO.: FIIS 13 P021
LOCATION: Window #2 - Inside Trim for Interior Sash

APPROXIMATE NUMBER OF LAYERS: 18+
SUBSTRATE: Wood

CHROMOCHRONOLOGY:

1. Cream
2. Cream
3. Cream
4. Shellac or varnish (?)
5. White
6. White
7. White
8. White
9. White
10. White
11. White
12. White
13. White
14. White
15. White
16. White
17. White
18. White

Figure 183. Tower interior: paint sample #FIIS 13 P021, trim for interior sashes (1983).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P025
LOCATION: Window #6 - Interior Sash

APPROXIMATE NUMBER OF LAYERS: 17+
SUBSTRATE: Wood

CHROMOCHRONOLOGY:

1. Cream
2. Cream
3. Shellac or varnish (?)
4. White
5. White
6. White
7. White
8. White
9. White
10. White
11. White
12. White
13. White
14. White
15. White
16. White
17. White

Figure 184. Tower interior: paint sample #FIIS 13 P025, interior sashes (1983).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P027
LOCATION: Window #6 - Trim

APPROXIMATE NUMBER OF LAYERS: 17+
SUBSTRATE: Wood

CHROMOCHRONOLOGY:

1. Cream
2. Cream
3. Shellac or varnish (?)
4. White
5. White
6. White
7. White
8. White
9. White
10. White
11. White
12. White
13. White
14. White
15. White
16. White
17. White

Figure 185. Tower interior: paint sample #FIIS 13 P027, window frame (1983).

Structure and Glazing

Description

Material Wrought-iron posts, horizontal members, spider frame, lower frame, and suspension rods. Bronze sill sheathing and glass-stop plates.

Dimensions
Interior diameter 11 feet 4 inches
Height of sashes from floor to cornice 9 feet 9 inches.
Glass: Lower pane 27 5/8 inches long by 30 ¾ inches wide
Middle pane 27 5/8 inches long by 39 inches wide
Upper pane 27 5/8 inches long by 38½ inches wide
Existing glass one-quarter of an inch thick.
Sash rabbet three-quarters of an inch wide.
Tie rods 1½ inches deep by half an inch wide.

Design The first-order lantern has 16 sides, each consisting of three panes of glass, one atop the other. The glass is held in place by a frame made of 16 vertical posts joined by short horizontal members. There is one "ring" of short members at floor level that forms a sill. Each of these members is bolted to the floor with two bolts, and to its flanking posts with one bolt per end. The members are trough-shaped, with their outer edges being rabbeted to receive the bottom edge of the bottom pane of glass. Each of these members is sheathed with bronze, and is pierced with two small weep holes (a quarter-inch in diameter at the rear of the trough). There are three other "rings" of horizontal members farther up the side of the lantern. Two of these rings act as sash bars for the panes of glass. They resemble the sill members in design, but are narrower. Each of these members is bolted to its flanking posts with two bolts per end; each has a single oval weep hole at its center. The widest dimension of the hole varies from three-sixteenths of an inch to one-quarter of an inch. The uppermost ring of short members forms a cornice. The interior face of every other post displays the ghost of a now-missing plate, which presumably held a pulley relating to the curtains. Four screw holes remain in the vicinity of each ghost. The panes of glass are installed from the outside, being held in place by bronze plates that attach with screws. The plates–both the vertical and the horizontal ones–are secured with three bolts per plate. No storm sashes are extant, and the glazing is only a single thickness.

The side walls of the lantern are topped by two wheel-like frames. The uppermost frame is called a spider frame in the historic documentation (fig. 61). It has 16 ribs curving from a central apex down to the 16 posts of the lantern's sides, to which they are bolted. The ribs are stiffened by a ring of purlins located about three-fifths of the way up from cornice level. Each purlin is bolted to its flanking ribs with two bolts per end. The lower wheel-like frame sits just above cornice level. It consists of 16 horizontal tie rods, whose outer ends are bolted to the feet of the 16 ribs of the spider frame. The tie rods' inner ends run into a central hub. (This is currently concealed by a black-painted plywood disk attached to the bottom of the frame.) This frame is supported near its hub by eight suspension rods; a rod descends from

every other rib to that rib's corresponding tie rod. The jointing details can be seen in figures 61-62. All of the ribs feature a screw eye about 8 inches above cornice level. They may relate to the former curtains.

Finishes Sashes painted white.
Sill trough painted gray like the floor.

Condition

Structure Some of the sill-troughs are filled with water and debris. The cast-iron bolts securing the sills are badly deteriorated. Paint is chipped on the sashes and roof structure. The juncture of the roof structure with the cornice is corroded in several areas, possibly the result of galvanic action between the different metals.

Glass There are 11 cracked panes of glass among the glazing. If the sides are numbered from the north, clockwise, the broken panes are as follows:

Sash #1	lower pane, cracked at bottom
Sash #2	lower pane, cracked at west lower corner
Sash #8	lower pane, cracked in west lower corner
Sash #10	middle pane, cracked in west upper corner and across middle of glass
Sash #11	upper pane, cracked from east lower corner to top
Sash #13	lower pane, cracked at north lower corner; upper pane, two-thirds of window missing on south side.
Sash #14	upper pane, vertical crack down center and small section missing
Sash #15	lower pane, cracked in south corner
Sash #16	upper pane, cracked in east corner; lower pane, cracked in east corner

The putty is cracked, deteriorated throughout, and missing in large areas. The glass plates are significantly narrower than the rabbets that hold them.

Documentation

Figures 186-193.

Paint samples FIIS 13 P002: lantern interior, sill at bottom of sashes (figs. 194-195).
FIIS 13 P053: lantern interior, sill at bottom of sashes.
FIIS 13 P054: lantern, lower end of vertical post at floor level.
FIIS 13 P055: lantern sashes, plus upper horizontal sash bar.
FIIS 13 P072: lantern ceiling, black plate iron.
FIIS 13 P073: lantern ceiling, copper.
FIIS 13 P074: roof structure, tie rod.

Historical Background

Structure

The basic structure of the lantern has remained intact and appears today as constructed. The original framing that survives includes the wrought-iron lantern posts and the sill members, the horizontal sash bars, the suspension and tie rods, the spider frame, and the lower frame. The bronze glass stops and sill sheathing are original, as well.

Repairs and alterations to the structure include the following recorded changes:

1884 work for strengthening and better securing the lantern.
1886 lantern thoroughly overhauled and refitted with new screws.
1894 proposed change of the light involved the installation of a temporary fourth-order light; this action would have affected the lantern, but it was not implemented.

Glazing

No original lantern glazing remains. Apparently the glazing was continually being replaced, as implied in the following commentary from *Scientific American* magazine, August 9, 1890 (App. C-95): "The thick lenses of the lantern are seen to be cracked and chipped off in places, and the keeper of the lighthouse states that this has been caused by ducks and geese in their migrations flying through the glass which covers the outside of the lantern, and which is an eighth of an inch thick, and striking the heavy lenses with their bills." Below are listed the recorded references to reglazing:

1880 Form 36 noted the following data:
Height glazed. Nine feet nine inches (9 feet 9 inches)
Number of plates in height. Three
Number of plates in each side. Three
Thickness of plates. 3/8"
Size of different plates. Lower 27 5/8 inches by 30 ¾ inches
Middle 27 5/8 inches by 39 inches
Upper 27 5/8 inches by 26 ¾ inches
Number of storm panes of glass. None

1887 Plate glass for lantern repair procured; lantern reglazed and new screws substituted for those worn out by rust.
1888 Glazing of lantern repaired.
1897 Nine plates of lantern glass furnished.
1898 Six plates of lantern glass supplied.
1899 Ten plates of lantern glass and four storm pane clamps furnished.
1900 Eight plates of lantern glass (4) $27^{11}/_{16}$ inches by $38^{5}/_{8}$ inches; (4) $27^{11}/_{16}$ by $39^{1}/_{8}$ inches.
1901 Storm panes and clamp for lantern required.
1903 Six plates of lantern glass furnished.
1906 Ten plates of lantern glass furnished.

Braces, Collar, Railings, and Brackets

Description

Material Iron, except for the collar, which is bronze.

Dimensions Not taken.

Design

Braces The lantern features eight pipe-like diagonal braces. Their bottom ends are bolted to the deck of the lower balcony. The braces extend up past the outer edge of the upper balcony, to which they are secured by one iron strap each. The braces continue on to intersect the vertical posts of the lantern's sides, at a point several inches below the upper ring of sash bars. Each brace is attached to its post with three bolts. (Since there are eight braces, they attach to every other post.)

Collar The lantern's cornice is encircled by a bronze pipe. This pipe is attached to each vertical post by means of brackets.

Lower Balcony Railing The lower balcony railing consists of 16 large, round, cast-iron posts connected by three iron rails that follow the curvature of the lantern's circumference. The posts, which are cast in one piece, exhibit at floor level a plate and cylindrical sleeve section, which is bolted into the stone ledge of the deck. The posts feature raised rings above and below the juncture with the rails. The posts are finished at their upper end with a decorative cap with a flat top. The rails are equally spaced and are set into openings in the posts.

Upper Balcony Railing The upper balcony railing consists of 16 pipe-like posts–a little thicker than the piping used for the diagonal braces–that run up to a flat handrail. These posts end at the handrail, but 16 thinner pipes continue upward, to a point level with the collar around the cornice. The thinner pipes then bend toward the lantern, and intersect the brackets used to attach the collar to the 16 vertical posts. The flat handrail consists of four lengths bolted end to end.

Antenna Brackets There are three pairs of triangular brackets attached to the balconies of the light-house. The pairs on the northeast and southeast sides are probably those installed in 1958, as per figure 58. These are triangular in shape and horizontally oriented, with their feet attached to the edges of the balconies. The ones attached to the upper balcony are larger, having to project out farther to align with the brackets on the larger lower balcony. Each pair of brackets holds an antenna pipe, which formerly supported Coast Guard radio signal reflectors. These are now missing. Another set of similar brackets is found on the northwest side of the tower. This pair appears to be related to the partial use of the tower by a commercial radio station.

Finish Collar, braces, posts, and rails all painted black.

Condition The paint finish is deteriorated and peeling throughout. The posts and rails of the lower balcony show evidence of minor corrosion. The upper balcony posts and piping, as well as the diagonal braces, are badly eroded in areas. This condition may be due to abrasion caused by wind-blown sand.

Documentation

Figures 196-204.

Paint samples FIIS 13 P071: lower balcony, railing.

Historical Background

The railing extant on the lower balcony dates to 1902. The unusual railing around the upper balcony–with its long, thin pipes extending up to the lantern's cornice–probably dates to 1912. In that year, 16 posts were removed from that balcony, and a bird guard was installed, to keep birds from smashing into the lantern's glazing. This suggests that: (a) the original railing was removed in 1912; and (b) the unusual design of the current railing is part of the bird-guard system. In any case, figure 29, dating to 1921, shows the upper balcony railing as it exists today, so the present arrangement is the historic one.

No record remains of the original configuration of the railings. Evidence on the lower balcony deck suggests where the first posts were installed. The 1861 specifications (App. D-1) include a reference to a balcony railing, but how closely it resembled the original Fire Island railings cannot be determined. The 1871 drawing of a first-order lantern (fig. 62) includes a drawing of a railing for a lantern balcony, as well. The 1894 floor plan of the Watch Room deck and lower balcony (fig. 66) includes the location of 18 railing posts.

It seems that the original railings of at least the lower balcony were of brass. A workman named Frank E. Jones wrote to Major W.J. Russell, the Third District engineer, on September 17, 1902, as follows:

> I...removed part of old brass railing [and] placed new iron railing on Lantern deck, it is necessary to have two cast iron rollers for out side storm door of tower as per sketch. Also new sheet iron for iron door of lantern deck as per sketch.

The date of the braces is unknown. They do not appear in figure 6, thought to be an original plan, or in the early photographs. Figure 6 errs in other details, however, and the early photographs are none too clear. The braces first appear in an 1894 drawing (fig. 65), and a reference dating to 1896 notes that the bolts in the lantern braces were replaced.

The origin of the "collar" pipe around the lantern's cornice is unclear. The collar relates most directly to the present upper balcony railing, probably installed in 1912. However, the pipes of the upper balcony's railing look as though they were attached to the present collar sometime after it was installed. The documentation mentioned that in 1892, a "new collar" was fitted to the lantern dome to "hold pipes." Thus, it seems that there was a collar in place before 1892, and that it was replaced in 1892 with the present one. The function of the pipes that it was to hold is not known;

they may be the pipes at cornice level designed to carry off rainwater. The piping of the upper balcony would not have been added until 1912.

Recorded alterations and repairs to the braces, collar, and railings are listed below, chronologically:

1877 - new posts for gallery around Watch Room [lower balcony] made and fitted; railing required.

1880 - Form 36: balustrade and outside gallery, copper pipe railing, iron gallery.

1892 - new collar fitted on lantern dome to hold pipes.

1896 - sixteen new bolts in lantern braces installed.

1901 - noted new railing for lower balcony required; noted machinist sent to station to measure for new iron railing for lantern; contract awarded in Dec. 1901 to Allentown Rolling Mills, Allentown, Pennsylvania, for furnishing cast-iron railing posts, railing for lower balcony.

1902 - new iron railing on lower balcony fitted.

1912 - sixteen iron posts removed from upper balcony, and bird guard installed on lantern.

Roof Covering

Description

Material Copper sheathing; plate-iron flashing.

Dimensions Not taken.

Design The roof covering was not accessible for examination from above. Figures indicate raised seams above the rafters. Further investigation is required of the details of construction, including the design of the seams and the flashing. As seen from the lantern interior, the underside of the copper roof covering is covered by plate iron at its outer circumference. A stovepipe hole and tube pierces the roof at the lantern's north side.

Finish Exterior: painted black
Interior: circumference of plate metal painted black, copper sheets painted white.

Condition Exterior condition requires further investigation; interior paint alligatored.

Historical Background

How much, if any, of the original roof covering survives has not been determined. Further investigation of the roofing is required. The roof covering appears to have always been copper with raised seams on the exterior. Noted repairs and alterations are as follows:

1865 - lantern roof leaked on the NE side, and needed repairing and repainting.

1875 - roof of lantern patched.

1880 - dome and cowl recorded as copper.

1881 - roof leaked.

1888 - roof of lantern put in good order.

1905 - three sections of new lining in dome of the lantern fitted; new smokestack supplied; copper roof of lantern repaired.

Roof Ventilator

Description

Material Copper

Dimensions Not taken.

Design Although the roof ventilator could not be investigated because of inaccessibility, it appears to be constructed as drawn in figure 62, no. 15.

Finish Exterior unfinished; interior painted white.

Condition Dents are visible on the west side of the copper ball. The pinnacle rod is bent.

Historical Background

Given the difficulty of investigating the roof ventilator closely, it is thought to be original. It resembles in detail the roof ventilator included in the August 1871 drawing of a first-order lantern (fig. 62), as well as the ventilator that appears in the 19th-century photographs.

Today, the ventilator exhibits a dent in its southwest side; this same dent can be identified in the August 12, 1900, photograph (fig. 20). The August 9, 1890, article in *Scientific American* magazine notes: "The large metal ball which surmounts the structure has been bent nearly twisted from its position by flocks of brant, which is a species of wild goose, coming in contact with it."

Lightning Rod and Conductor

Description

The extant lightning conductor presumably dates to ca. 1912, when the current protective coating was applied. How many times the lighthouse was fitted with new conductors is not known. Further physical investigation of the lantern roof, the lantern, and the tower shaft may offer more conclusive data.

Constructed of woven copper, the existing lightning conductor is no longer functional. It has been severed in several places, as a result of the detachment of the 1912 coating from the tower shaft. The lightning conductor appears to be in a location similar to that of the historic conductor.

Documentation

Figures 205-206.

Historical Background

The specific design, materials, and placement of the original lightning rod and conductor installed to protect the Fire Island lighthouse from lightning damage is not known. The most pertinent information of the period, which may offer some clues, is found in the 1861 specifications for a "Brick Tower" (App. D-1). These specifications refer to a lightning rod as follows:

> A lightning rod, less than 3/4 inches diameter made of copper wire rope, must be provided. It must be fastened to the tower with copper fastenings, and is to extend from the foot of the lantern pinnacle to some point of the ground, not less than 40 feet from the center of tower; then to descend vertically 10 feet, or further if the ground is too dry at that depth. A barrel of powdered charcoal must be rammed around the lower end of rod.

The annual report for 1874 (App. C-74) describes the lightning conductor as not being properly led. The Form 36 dating to March 1880 (App. C-86) distinguishes between the lightning conductor spindle, which was copper with a platinum point, and the lightning conductor, which was a copper rod attached to the outside of the tower.

Probably the most significant late 19th-century item relating to lightning conductors was a December 21, 1886, action of the Lighthouse Board. The board prescribed a system of lightning conductors, and in a letter to all lighthouse engineers, directed that the system be adopted in all structures requiring them, and that alterations be made to those currently in position. The complete letter is included as Appendix D-3.

Four historic photographs of the Fire Island lighthouse show a lightning conductor, as follows:

Figure 20 (August 12, 1900): the lightning conductor is shown secured to the pinnacle rod, positioned to hang over the north roof and along the north elevation of the lantern, emerging over the tower cornice to descend along the north elevation of the brick shaft. The lower end is not visible in the figure.

Figure 29 (June 12, 1921): the photograph is fuzzy, but what appears to be a lightning conductor is vaguely visible at the lantern level.

Figure 37 (1945): the conductor can be seen at the cornice level.

Figure 43 (1981): this more recent figure features the lightning conductor, intact and descending along the north elevation of the brick tower.

Only one 20th-century documentary reference concerning the tower and lightning conductor was located. This reference describes a lightning strike at the structure. Dated August 30, 1918, a letter from the keeper of the Fire Island lighthouse notified the Superintendent of Lighthouses of the following (App. C-135):

> At 8:10 P.M. last eve. lightning struck the ball on roof of lantern, and punctured a hole through the seam about 1 inch long and ½ in. wide.
>
> It then went in the Watch Room and burned a small place on the column and followed down call-bell wire to hall of dwelling and burned out telephone wire and demolished switch box connected with telephone.
>
> I filled hole in ball with red lead and painted over it this morning.

Details

Description

Curtain Fixtures The lantern's sash posts at the cornice line are fitted with curtain brackets. Curtains are no longer extant, nor are the rods. Ghosts for curtain pulleys (presumably of bronze) are visible approximately 6 inches up from the lower horizontal sash bar. As mentioned, the rafters feature screw eyes that may have been related to the curtains.

Handles Bronze handles are located on the exterior of the lantern, bolted through the glass stops to the posts. Originally, there were 32 (two per post). They were approximately centered with the middle plates and upper plates. Today, only the upper handles remain; the lower ones have been removed. They were constructed as drawn in figure 61, no. 6. The handles that remain are painted black.

Ladder A wrought-iron ladder remains on the west elevation of the Watch Room, leading from the lower balcony to the upper balcony. It is similar, but not identical, to the ladder drawn in figure 62, nos. 10, 14, 18, and 20. The ladder is painted black.

Documentation

Figures 207-209.

Historical Background

The curtain fixtures, bronze window handles, and balcony ladder are original.

The curtains no longer remain, although the curtain fixtures are extant. The date of the curtains' removal is not known; it presumably related to the removal of the Fresnel lens ca. 1933. Figures 20 and 29 display the lantern curtains drawn. Several historical references to the curtains and curtain fixtures were located, as follows:

1862 - estimate submitted for lantern curtains.
1877 - rubber-coated cords fitted to lantern curtain rollers.
1880 - Form 36: "Curtain hooks inside of Lantern - how fitted. None."
[this comment appears to be inaccurately recorded].
1903 - curtain rollers of lantern repaired.

Originally 32 bronze handles were secured to the outside glass stops of the lantern. The upper set remains in place, while the lower set was removed in the 1970's.

The ladder is in its original location. In 1880, it was recorded that one ladder of wrought iron was extant for cleaning plate glass.



Figure 186. Tower interior: lantern posts and sills (1982).



Figure 187. Tower interior: detail of lantern sill (1982).

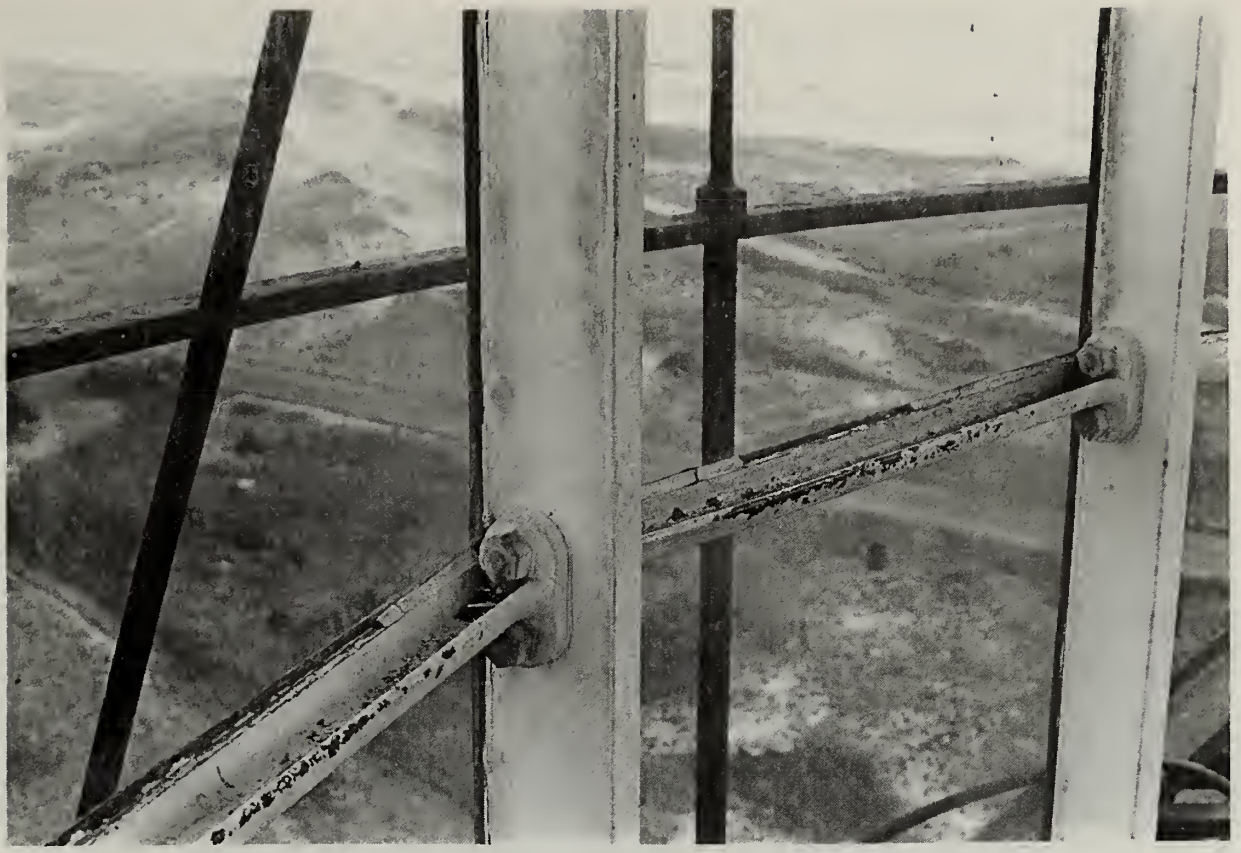


Figure 188. Tower interior: lantern sash bars (1982).

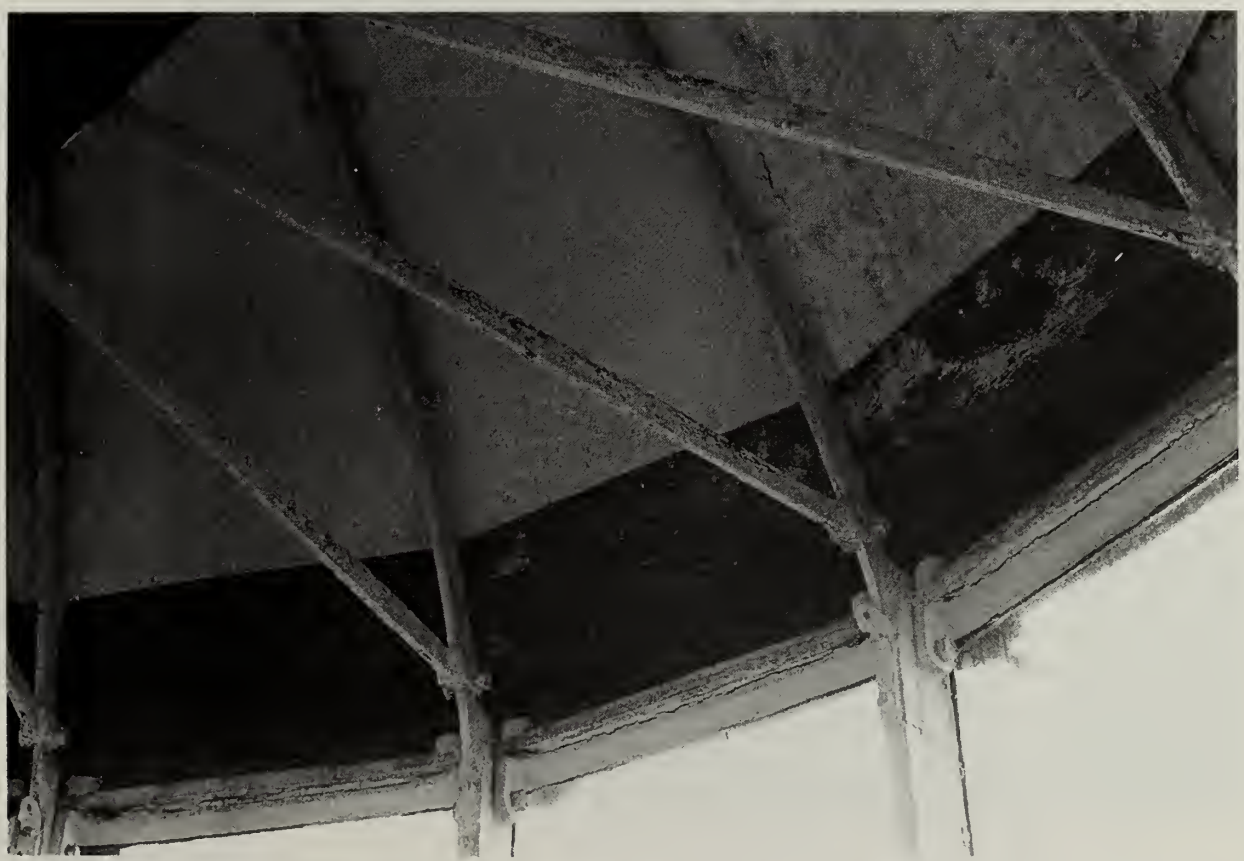


Figure 189. Tower interior: lantern roof, junction of spider frame and lower frame (1982).



Figure 190. Tower interior: lantern roof, spider frame, and suspension rods (1982).



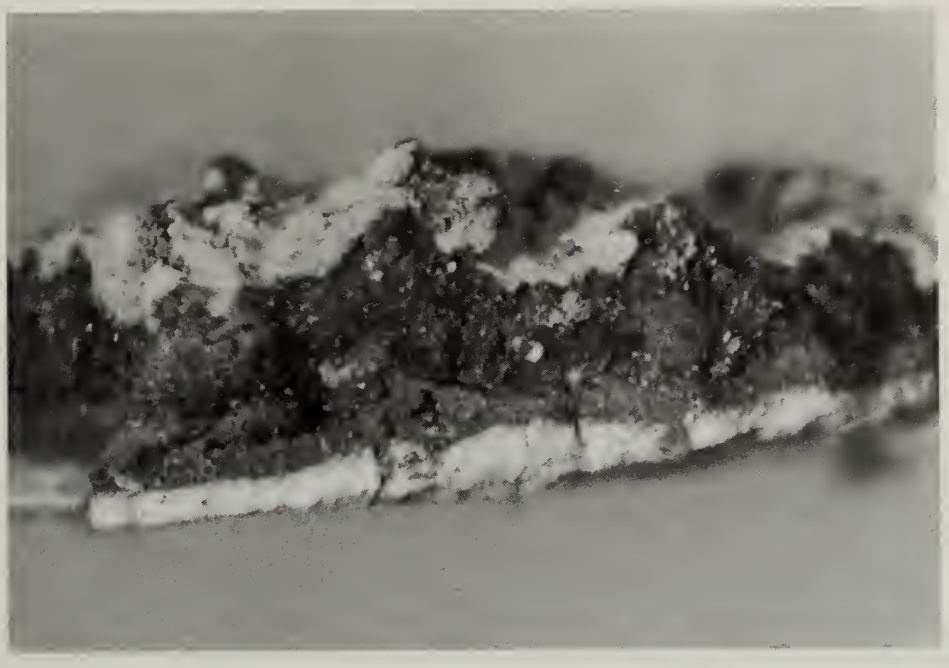
Figure 191. Tower interior: lantern roof, with lower frame, tie rods, and hub above plywood disk (1982).



Figure 192. Tower interior: lantern cornice area and stovepipe hole (1982).



Figure 193. Tower interior: lantern cornice area, deterioration of fittings (1983).



NOT FOR COLOR USE

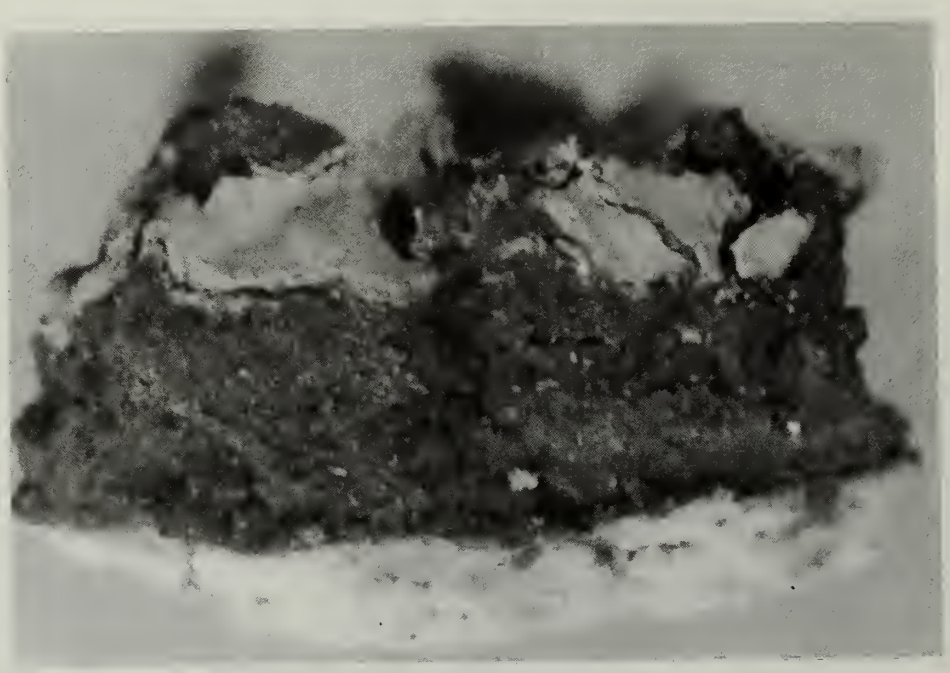
SAMPLE NO.: FIIS 13 P002
LOCATION: Lantern Interior Post, Sill

APPROXIMATE NUMBER OF LAYERS: 8
SUBSTRATE: Metal

CHROMOCHRONOLOGY:

1. White
2. Dark yellow ochre
3. Rust brown
4. Red
5. Dark green
6. Red
7. Rust brown
8. Gray

Figure 194. Tower interior: paint sample #FIIS 13 P002, lantern sill (1983).



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P002
LOCATION: Lantern Interior Post, Sill

APPROXIMATE NUMBER OF LAYERS: 10+
SUBSTRATE: Metal

CHROMOCHRONOLOGY:

1. White
2. Dark yellow ochre
3. Rust brown
4. Red
5. Dark green
6. Rust brown
7. Red
8. Medium brown
9. Off white
10. Gray

Figure 195. Tower interior: paint sample #FIIS 13 P002, lantern sill (1983).

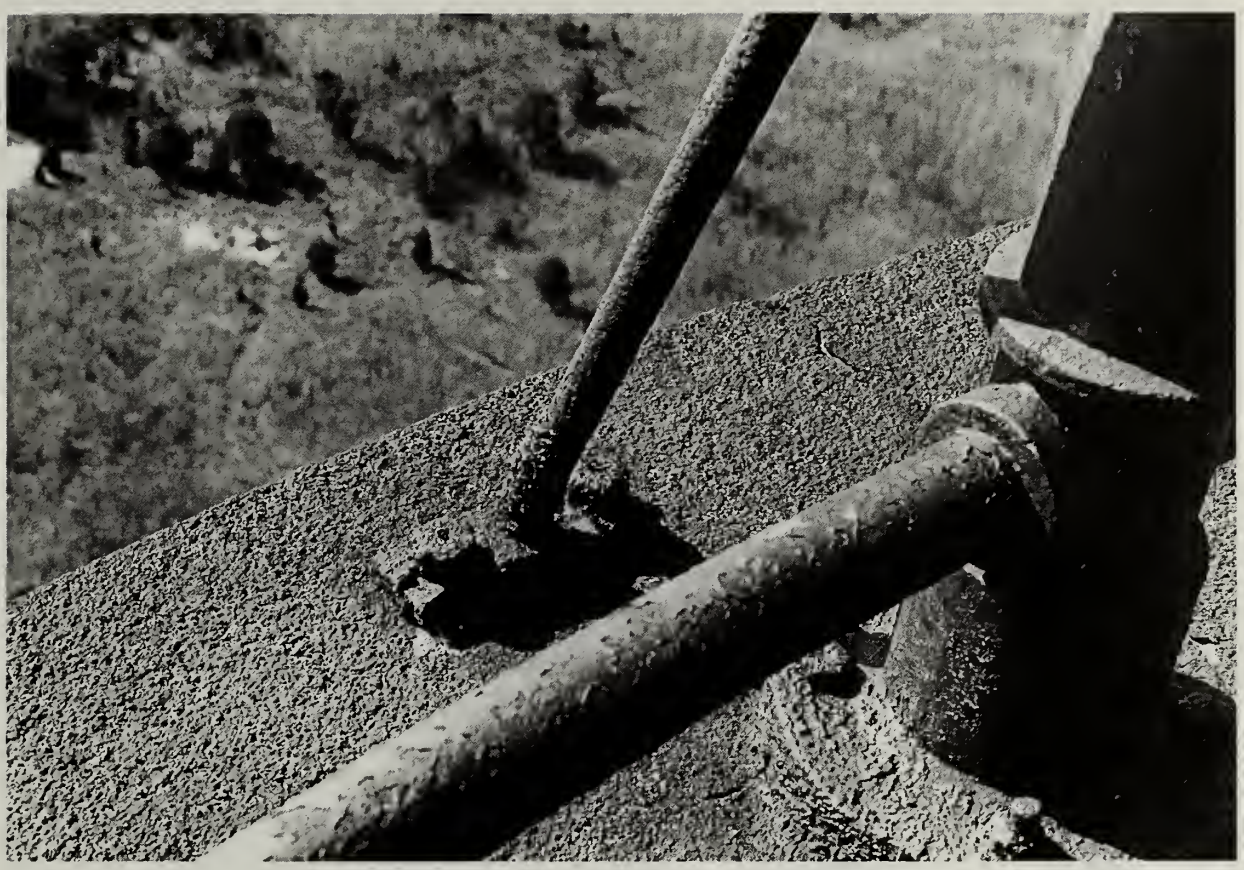


Figure 196. Tower exterior: diagonal brace bolted to deck of lower balcony (1983).



Figure 197. Tower exterior: diagonal brace at lower balcony (1982).



Figure 198. Tower exterior: diagonal brace tied to deck of upper balcony (1983).



Figure 199. Tower exterior: diagonal brace bolted to side of lantern, and railing of upper balcony (1983).

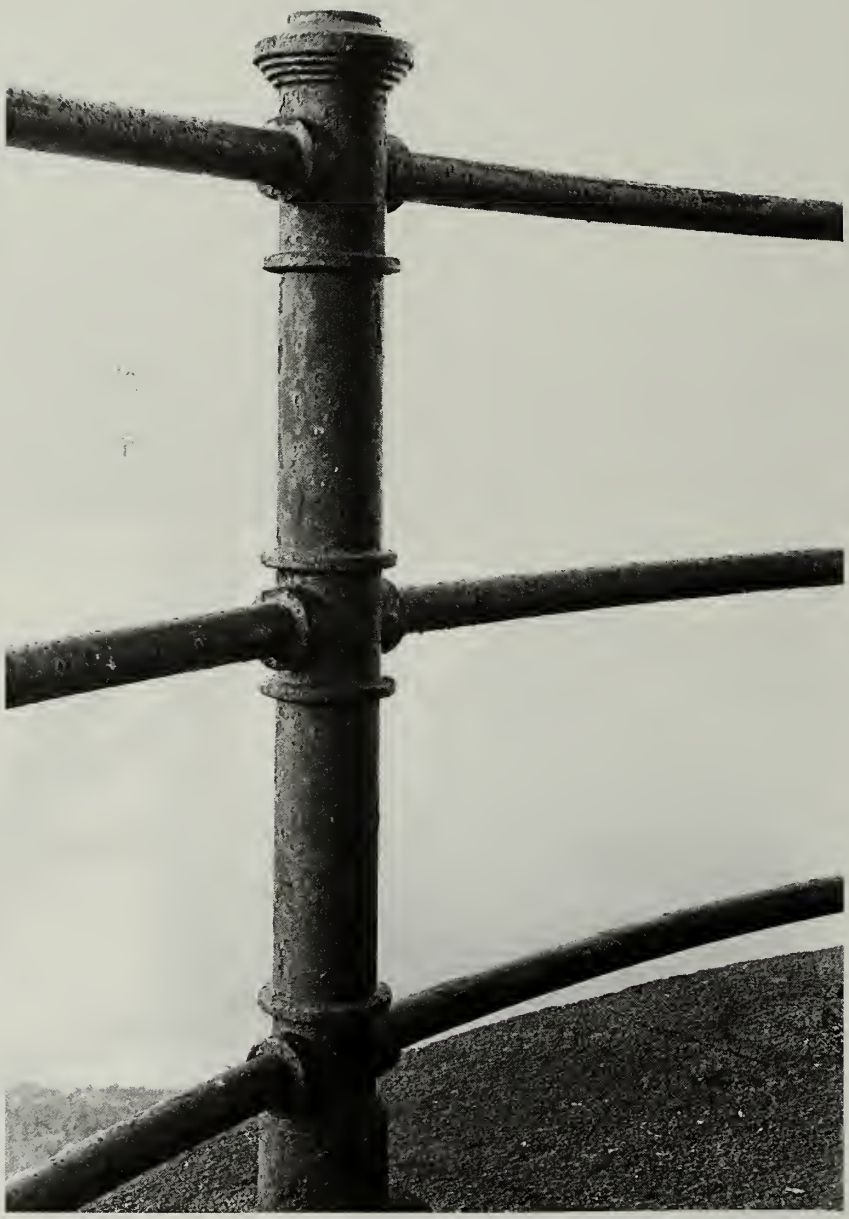


Figure 200. Tower exterior: railing of lower balcony (1982).



Figure 201. Tower exterior: evidence of earlier railing for lower balcony (1983).



Figure 202. Tower exterior: underside of deck of upper balcony, with bolt for railing (1983).

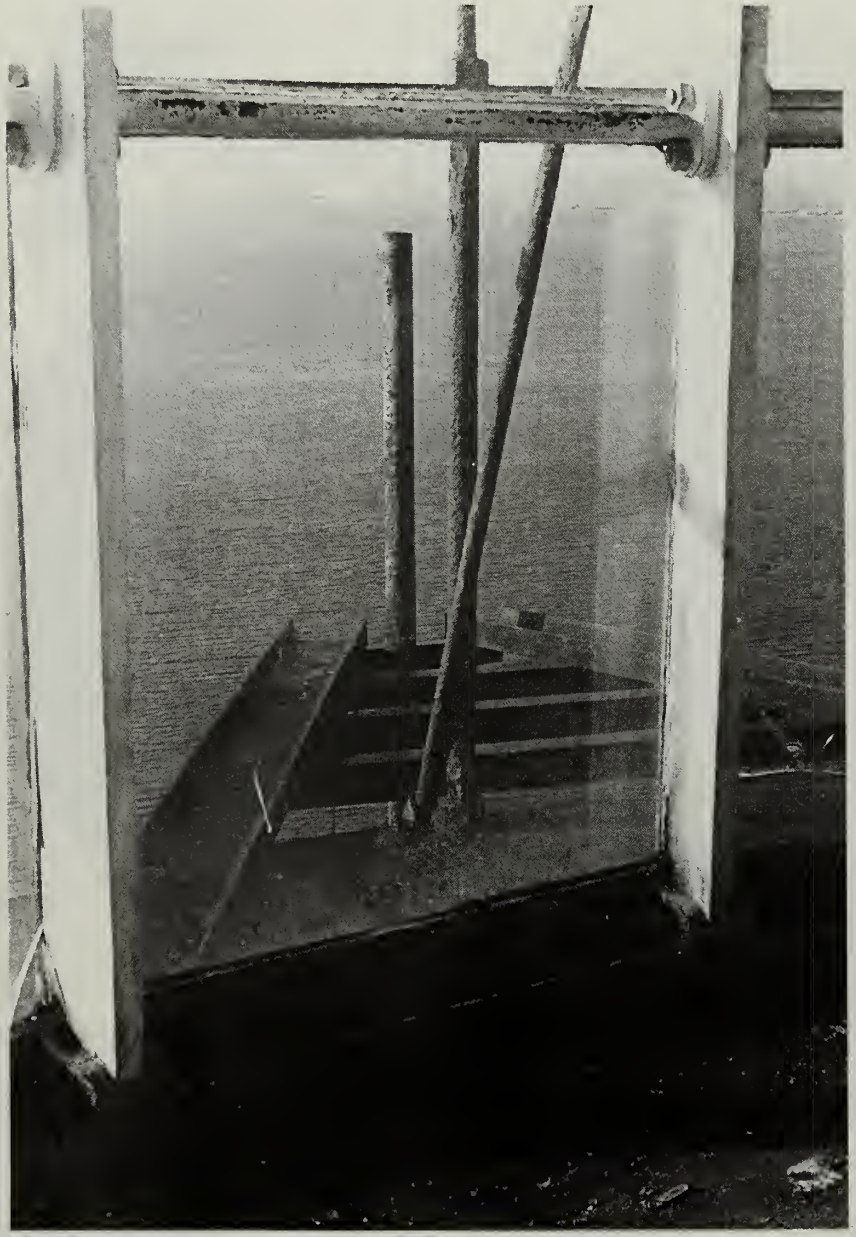


Figure 203. Tower exterior: reflector antenna bracket (1982).



Figure 204. Tower exterior: antenna (1982).



Figure 205. Tower exterior: lightning-rod cable at lower balcony (1983).



Figure 206. Tower exterior: lightning-rod cable at tower base (1983).



Figure 207. Tower interior: detail of bracket for lantern curtain (1983).

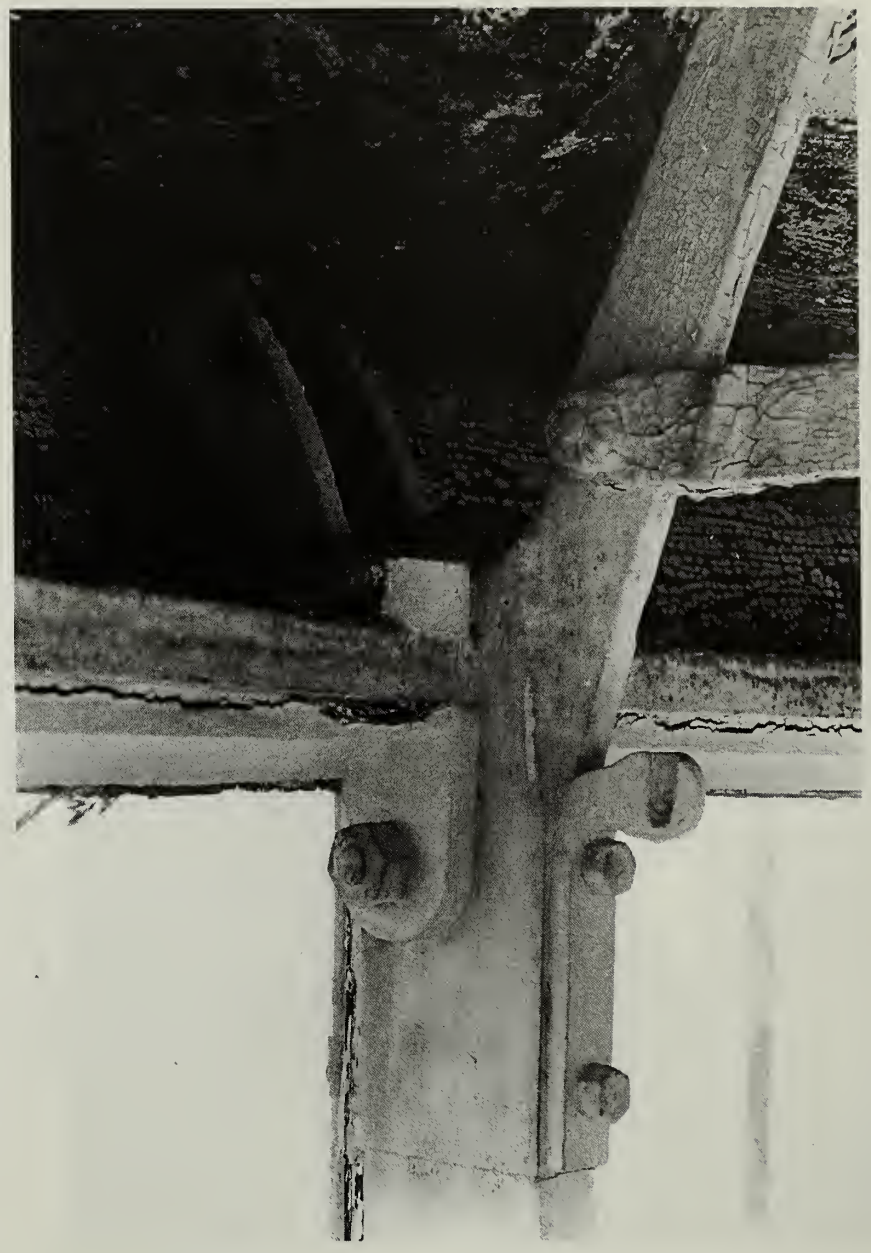


Figure 208. Tower interior: detail of bracket for lantern curtain (1983).

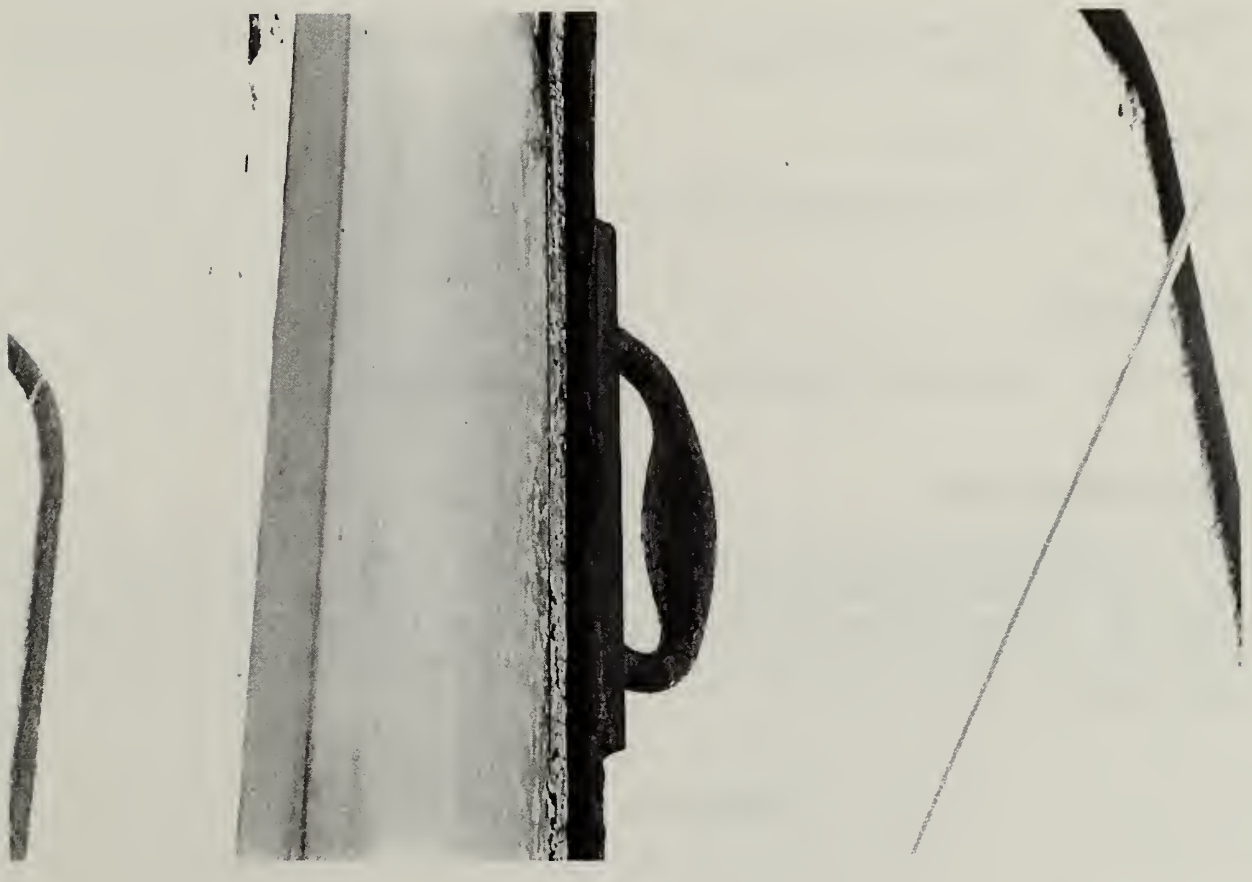


Figure 209. Tower exterior: detail of bronze handle (1983).

THE LIGHT

Pedestal

Description

Material Cast iron.

Design As drawn in Figure 70. East side has four electric boxes mounted on it; south and east plate doors missing.

Finish Painted gray.

Condition Good; cluttered with wiring; some paint loss.

Documentation

Paint sample FIIS 13 P050: Watch Room, 1933 pedestal (fig. 210).

Historical Background

The light-apparatus pedestal was installed during 1933, according to figures 70-72. These figures were drawn in 1932, and were prepared in conjunction with the electrification of the Fire Island light. The new light consisted of a remodeled first-order lens taken from the discontinued Shinnecock Light Station. The pedestal's first paint layer is a red lead, followed by only several other paintings.

Illuminating Apparatus

Description

The extant electric first-order lighting equipment remains largely as it was when service was discontinued on December 31, 1973. It is a combination of equipment installed mostly in 1932, but updated at least twice. In 1932, the "lens and mercury float apparatus" from Shinnecock Light Station was transferred to Fire Island (App. C-145). The apparatus was modified to have four single 45° flash panels and four 45° blank panels, spaced alternately 90° on center. This installation, along with the pedestal on which it sits, is diagramed in figures 70-72. In 1938-1939, a motor drive replaced the clockworks as the means of making the light revolve, and a new lamp stand was added (App. C-149). An automated lamp was installed in 1951, according to an undated newspaper article found in the Fire Island National Seashore library.

Documentation

Figures 211-212.

Historical Background

If the restoration period is to be the year 1939, the only posthistoric modification that would have to be reversed is the 1951 automation of the lamp.



NOT FOR COLOR USE

SAMPLE NO.: FIIS 13 P050
LOCATION: Watch Room - 1930's Pedestal

APPROXIMATE NUMBER OF LAYERS: 6
SUBSTRATE: Metal

CHROMOCHRONOLOGY:

1. Bright orange
2. Bright orange
3. Rust brown
4. Medium brown
5. Gray
6. Gray

Figure 210. Tower interior: paint sample #FIIS 13 P050, Watch Room pedestal (1983).



Figure 211. Tower interior: extant lighting apparatus (1982).



Figure 212. Tower interior: extant lighting apparatus (1982).

National Park Service
U.S.Department of the Interior



Historic Architecture Program
Northeast Region
Boott Cotton Mills Museum, 4th Floor
115 John Street
Lowell, MA 01852

EXPERIENCE YOUR AMERICA ™
Photograph courtesy The Mariner's Museum, ca. 1935